



# **Clean Coal Technology III Public Meetings**

**Sponsored by the U.S. Department of Energy**  
**Office of Fossil Energy**

## **Background Information**

### **Public Meetings for Views and Comments on the Conduct of the 1989 Clean Coal Technology Solicitation**

**Denver, Colorado, January 18, 1989**  
**Irving, Texas, February 2, 1989**  
**Atlanta, Georgia, February 16, 1989**



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**Denver, Colorado, January 18, 1989**

**Irving, Texas, February 2, 1989**

**Atlanta, Georgia, February 16, 1989**



**PUBLIC MEETING FOR VIEWS AND COMMENTS  
ON THE CONDUCT OF THE  
1989 CLEAN COAL TECHNOLOGY  
SOLICITATION**

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**BACKGROUND INFORMATION**

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1. Federal Register Notice of December 14, 1988: *"Invitation for Public Views and Comments on the Conduct of the FY 1989 Clean Coal Technology Solicitation; Notice of Meetings."*
2. Department of Energy News Release of December 27, 1988: *"DOE Sets Dates for Public Meetings to Discuss Clean Coal Round #3 Competition".*
3. Supplement to the Federal Register Notice: *Letter of transmittal to prospective attendees.*
4. Department of Energy, FY 1989 Congressional Budget Request: *Clean Coal Technology.*
5. (a) Department of Interior and Related Agencies Appropriations, Fiscal Year 1989. *Public Law No. 100-446, September 27, 1988, excerpt.*  
(b) Conference Report 100-862, to accompany Public Law No. 100-446, excerpt.  
(c) Senate Report 100-410, to accompany Public Law No. 100-446, excerpt.  
(d) House Report 100-713, to accompany Public Law No. 100-446, excerpt.



6. (a) Department of Energy News Release of November 9, 1988: "DOE Schedules Western Meeting to Increase Participation in Clean Coal Technology Program."  
  
(b) Speech by J. Allen Wampler entitled, "Clean Coal Technology - The Role of the West"; Remarks to the Public Meeting on Western Participation in the Clean Coal Program in Cheyenne, Wyoming, December 2, 1988.  
  
(c) Transcript of Proceedings, In the Matter of: "Meeting on Increasing Western Participation in the 1989 Clean Coal Technology Solicitation", on December 2, 1988.
7. Speech by J. Allen Wampler entitled, "Clean Coal Technology - The need for a Progressive Regulatory Environment"; remarks to the Coal Market Strategies Conference in Denver, Colorado on November 2, 1988.
8. U.S. Energy Policy 1980-1988, DOE S/-0068, October 1988, excerpt, Chapter Five.
9. Statement by Jack S. Siegel of June 22, 1988; testimony before the Subcommittee on Energy and Power, Committee on Energy and Commerce.
10. Statement by J. Allen Wampler of April 18, 1988; testimony before the Subcommittee on the Interior and Related Agencies, Committee on Appropriations, U.S. Senate.
11. Opening Statement by J. Allen Wampler of March 2, 1988; testimony before the Subcommittee on Energy Research and Development, Committee on Science, Space and Technology, U.S. House of Representatives.
12. Speech by Jack S. Siegel entitled, "Implementation of the President's Innovative Clean Coal Technology Program: A Status Report," on February 18, 1988; speech at the 15th Energy Technology Conference, Washington, DC.
13. Speech by J. Allen Wampler entitled, "Clean Coal Technology - America's Marketing Edge," on February 11, 1988; speech at the 6th World Conference, sponsored by the Mississippi Valley Coal Exporters Council, New Orleans, Louisiana.



**FEDERAL REGISTER NOTICE OF DECEMBER 14, 1988**

**INVITATION FOR PUBLIC VIEWS AND COMMENTS ON  
THE CONDUCT OF THE FY 1989 CLEAN COAL  
TECHNOLOGY SOLICITATION; NOTICE OF MEETINGS**



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December 14, 1988

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This subsequent arrangement will take effect no sooner than fifteen days after the date of publication of this notice.

For the Department of Energy.

Date: December 8, 1988.

George J. Bradley, Jr.,

Principal Deputy Assistant Secretary for International Affairs and Energy Emergencies.

[FR Doc. 88-28772 Filed 12-13-88; 8:45 am]

BILLING CODE 6450-01-M

## Office of Fossil Energy

### Invitation for Public Views and Comments on the Conduct of the 1989 Clean Coal Technology Solicitation; Meeting

**AGENCY:** Office of Fossil Energy, DOE.

**ACTION:** Notice of meetings to invite public views and comments on the conduct of the 1989 Clean Coal Technology solicitation, and to invite the public to participate in briefings by Department of Energy (DOE) officials on the Department's rules and procedures for awarding financial assistance.

### Introduction

The third Clean Coal Technology (CCT) solicitation (to be issued by May 1, 1989) is related to the decision by President Reagan on March 18, 1987, to seek \$2.5 billion to fund the demonstration of innovative clean coal technologies over a five-year period. President Reagan directed the projects be selected, to the extent possible, using the criteria recommended by the Special Envoys on Acid Rain, Drew Lewis of the United States, and William Davis of Canada. In January of 1986, the appointees issued the *Joint Report of the Special Envoys on Acid Rain*, also known as "the Lewis/Davis Report." The Special Envoys provided twelve recommendations, the first one of which was that the:

U.S. government should implement a five-year, five-billion-dollar control technology commercial demonstration program. The federal government should provide half the funding . . . for projects which industry recommends, and for which industry is prepared to contribute the other half of the funding.

To advise DOE on the CCT Program, the President directed the Secretary of Energy to establish the Innovative Control Technology Advisory Panel (ICTAP). On June 9, 1987, the Secretary named the charter members of ICTAP. As of this writing, there are 39 panelists representing federal agencies, government representatives from a cross

section of affected states, producers and users of coal, environmental groups, unions, Indian tribes, and the Government of Canada; the Chairman of ICTAP is Deputy Secretary of Energy Joseph F. Salgado.

On December 22, 1987, Pub. L. No. 100-202, "An Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1988, and for Other Purposes," was signed into law. This Act, among other things, provided \$575 million to conduct cost-shared innovative clean coal technology (ICCT) projects to demonstrate emerging clean coal technologies that are capable of retrofitting or repowering existing facilities. Pub. L. No. 100-202, in its reference to Pub. L. 99-190 of December 19, 1985, also specifically addressed the levels and forms of cost sharing that were applicable to proposed projects. On February 22, 1988, the Innovative CCT Program Opportunity Notice (PON) was issued in accordance with the requirements of that Act. Proposals were due by May 23, 1988, and on September 28, 1988, DOE announced the 16 proposals that were selected to proceed to award of cooperative agreements.

Public Law No. 100-446, "An Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1989, and for Other Purposes" (the "Act"), enacted on September 27, 1988, provides, among other things, that \$575 million be made available for additional CCT demonstration projects, and "That projects selected . . . shall be subject to all provisos contained under this head in Public Laws 99-190 and 100-202 as amended by this Act."

Furthermore, the accompanying Conference Report 100-862 (the "Report") stipulates that, "a request for proposals should be issued by May 1, 1989, with proposals due no later than 120 days after issuance of the request for proposals [by August 28, 1989], and that the Secretary of Energy should make project selections no later than 120 days after receipt of proposals [by December 26, 1989]."

### Purpose of the Meetings

In general, the goal of the anticipated ICCT solicitation will be to implement the legislative guidance contained in Pub. L. No. 100-446 and the accompanying Conference Report, and to further implement the Administration's decision to provide funding of \$2.5 billion for the demonstration of innovative clean coal technologies over a five-year period.

The CCT program will yield significant benefits to the United States, not only in terms of cleaner air and the increased use of coal, our most abundant energy resource, but also by:

- Addressing the concerns regarding global warming by significantly increasing the efficiency of power generation: in some cases, electricity may be produced with perhaps 10 to 30 percent less carbon dioxide emitted,
- Improving the reliability of electric power stations by developing modular technologies, such that a number of small units would work together, rather than depending on a single large installation. Similarly, new CCT technologies may offer superior "load following" capabilities, and repowering will provide environmental benefits while increasing plant capacity,
- Greatly enhancing U.S. technological leadership and international competitiveness,
- Benefitting both eastern and western states by making available more cost-effective, fuel-flexible, power and industrial systems capable of using the full spectrum of U.S. coals,
- Improving our position in international trade by providing advanced technology that would make American coal more attractive to foreign markets, and by reducing the cost of producing energy-intensive U.S. goods,
- Helping to ensure that the U.S. enters the 21st century with a broad array of sophisticated, cleaner, and more economical coal-based energy technologies, rather than being limited to the more costly, less effective, environmental control options available today, and
- Enhancing the long term energy security of the United States.

However, DOE is interested in exploring alternatives that may be available with regard to how the May 1, 1989, solicitation is structured. The purpose of the meetings is to provide a conduit from the public to DOE. Accordingly, DOE is issuing this Notice in order to invite the public to attend any one of several meetings, and to give interested persons an opportunity to present their views, comments, and recommendations with regard to the forthcoming solicitation.

Nothing in this Notice should be considered as definite, final, or binding on DOE with regard to the nature and/or content of the solicitation. The public is further advised that DOE cannot reimburse those who attend the public meetings or otherwise submit views to DOE for any expenses that they may incur in responding to this notice.



### Proposed Outline of the Anticipated Solicitation

To establish a framework for discussion and comment, it is useful to outline generally the structure of the anticipated CCT solicitation.

The solicitation will be consistent with the Report guidance, which provides, among other things, that, "projects selected . . . shall be subject to all provisos contained under this head in Public Laws 99-190 and 100-202 as amended by this Act." The Report notes also that, "the procurement . . . is subject to the cost-sharing provisions of the previous two procurements."

DOE anticipates that the solicitation will invite applications for financial assistance awards and, accordingly, will be governed by DOE's Financial Assistance Rules, 10 CFR Part 600 (the "Rules").

The Rules establish uniform policies and procedures for the award and administration of DOE grants and cooperative agreements. (Both the 1986 PON and the 1988 PON specified that cooperative agreements would be awarded.)

Project sponsors would be required to share the costs of the projects, such that DOE would not finance more than 50 percent of the total project cost as of the date of award, and the solicitation may require, as was the case in the two previous PONs, that the cost sharing by the offeror be at least 50 percent in each of the project phases (in the past, design and permitting, construction and startup, and operation and disposition). Costs would be shared between DOE and the offeror on an "as expended," dollar-for-dollar, basis.

The solicitation may include Qualification Criteria, and provide that failure to meet any one, or more than one, of these criteria would result in rejection of the proposal and the cessation of its consideration for financial assistance. The Qualification Criteria stipulated in the previous PON were:

- The proposed demonstration project or facility (existing or new) must be located in the United States.
- The proposed demonstration project must be designed for and operated with coal(s). These coals must be from United States mines.
- The offeror must agree to provide a cost share of at least 50 percent of total project cost, with at least 50 percent in each of the three project phases.
- The proposer must have access to, and use of, the proposed site and any proposed alternate site(s) for the duration of the project.

- The proposed project team must be identified and firmly committed to fulfilling its proposed role in the project.

- The offeror agrees that, if selected, it will submit a "Repayment Plan" consistent with the requirements stated in the PON.

If the Qualification Criteria are met, a proposal would undergo preliminary evaluation, if such a phase is included in the solicitation. As noted above for the Qualification Criteria, failure to meet one or more of the Preliminary Evaluation requirements would result in rejection of the proposal and its elimination from further consideration for financial assistance. Preliminary Evaluation requirements were employed in the previous PON: Among other things, included were stipulations that the proposal must be consistent with the objectives of the PON; the proposal must contain sufficient technical, cost, and other information to enable Comprehensive Evaluation (discussed below); and, the proposal must be signed by a responsible official of the proposing organization authorized to bind the organization to the performance of the Cooperative Agreement in its entirety.

Once a determination is made that a proposal meets both (as may be applicable) the Qualification criteria and the Preliminary Evaluation requirements, it would then enter the Comprehensive Evaluation phase and be evaluated in accordance with the Criteria stated in the solicitation. The solicitation would state the different evaluation criteria, and describe the relative weights assigned to the Technical, Business and Management, and Cost aspects of the proposal. The solicitation also would provide guidance and instructions to prospective offerors on how to prepare and submit the proposal.

Evaluation criteria will be developed that are consistent with the guidance in the Act and the Report that selected projects shall be subject to all of the provisions (relevant to the solicitation) that were provided in Pub. L. No. 99-190, which governed the 1986 PON, and in Pub. L. No. 100-202, which governed the 1988 PON, as amended by the Act.

In developing the evaluation criteria, DOE will consider factors that would contribute to achieving the goals established by the Congress and by the Administration. Such considerations include reducing additional forms of pollution from coal combustion (that is, in addition to sulfur dioxide and oxides of nitrogen the "greenhouse gases" such as carbon dioxide). Other factors under consideration would be the potential for reducing the cost of producing

additional electric power and the expanded utilization of U.S. coals. The public is invited to comment on these factors, and to suggest others that might be used to evaluate proposed CCT projects.

The final consideration with regard to the selection of a proposal is the application of the Program Policy Factors (PPF). These factors are used to identify the proposals that, in the aggregate, best will achieve the CCT program objectives.

### Subjects of Particular Interest

DOE wishes to receive public views, comments, and recommendations on any and all aspects of the forthcoming anticipated CCT solicitation, that will assist DOE with the preparation of a solicitation that optimally balances the needs of the prospective offerors and the goals and objectives of the CCT Program.

DOE is particularly interested in suggestions that would lead to improved evaluation criteria, an increased number of proposed Western projects that respond to the solicitation, reduced cost of proposal preparation, and reduced time required for the negotiation of cooperative agreements.

### Meetings, Locations, and Dates

There will be three public meetings, at the locations and dates listed below:

1. Radisson Hotel Denver, 1550 Court Place, Denver, Colorado 80202 (Tel. 303-893-3333), at 8:30 a.m., on Wednesday, January 18, 1989.
2. Harvey Hotel-DFW Airport, 4545 W. John Carpenter Freeway, Irving, Texas 75063 (Tel. 214-929-4500), at 8:30 a.m., on Thursday, February 2, 1989.
3. Radisson Hotel Atlanta, Courtland and International Boulevard, Atlanta, Georgia 30303 (Tel. 404-659-6500), at 8:30 a.m., on Thursday, February 16, 1989.

### Format of the Meetings

All three of the meetings will follow the same format, as described below. Each meeting will commence with a brief plenary session that will include introductory remarks and program overviews by DOE officials. At about mid-morning, there will be a brief recess, after which there will be concurrent Discussion Workshops led by panels of DOE officials. There will not be any formal presentations or statements in the Workshops. Attendees will be asked to engage in informal, unstructured, discussions with the panelists on the subjects described earlier in this Notice, and on such other subjects as may be introduced by



members of the audience or by the panelists.

At the conclusions of the Workshops, attendees will meet in a closing plenary session. The discussions that ensued in the various Workshops, and the recommendations that resulted, will be reviewed and summarized. Each of the meetings will conclude with a presentation by DOE's Office of Procurement Operations on the rules and procedures applicable to the award and administration of financial assistance. The presentation will be followed by a question-and-answer period.

The meetings are expected to adjourn in the late afternoon.

#### **Public Participation**

Individuals may attend the meetings without notification in advance to DOE, and there is no registration fee or other charge for attendance. Attendees are responsible for making their own travel and lodging arrangements. DOE will not provide any meals or other refreshments at the meetings.

#### **Written Comments**

Written comments may be submitted by individuals who are not able to attend the public meetings, and also by persons who do attend one of the meetings and subsequently wish to provide written material to DOE. Written comments that include suggestions for the public meeting agendas (please indicate which of the three meetings is of particular interest to you) will be considered if they are received by December 30, 1988. Written comments with suggestions for the May 1, 1989, CCT solicitation will be considered if they are received by February 26, 1989. In all instances, written comments should be submitted in triplicate (if possible) to the address noted below:

#### **Address for Comments**

All written comments should be submitted to: Dr. C. Lowell Miller, Associate Deputy Assistant Secretary for Clean Coal, Fossil Energy, FE-22, U.S. Department of Energy, Washington, DC, 20585, (202) 586-7150.

Issued in Washington, DC, December 8, 1988.

J. Allen Wampler,

*Assistant Secretary, Fossil Energy.*

[FR Doc. 88-28773 Filed 12-13-88; 8:45 am]

BILLING CODE 6999-01-06



**DEPARTMENT OF ENERGY NEWS RELEASE OF DECEMBER 27, 1988**

**"DOE SETS DATES FOR PUBLIC MEETINGS TO  
DISCUSS CLEAN COAL ROUND #3 COMPETITION".**



# DOE

# NEWS

Coal

NEWS MEDIA CONTACT:  
Robert C. Porter, 202/586-6503

FOR IMMEDIATE RELEASE  
December 27, 1988

## DOE SETS DATES FOR PUBLIC MEETINGS TO DISCUSS CLEAN COAL ROUND #3 COMPETITION

The Department of Energy is beginning preparations for its third round of Clean Coal Technology competition by scheduling a series of public meetings in January and February 1989.

The meetings will be held in Denver, Colorado, on January 18; in Irving, Texas on February 2; and in Atlanta, Georgia on February 16.

The day-long meetings will give the public an opportunity to make suggestions for the department's forthcoming call for clean coal proposals. This fall, Congress approved a funding level of \$575 million for a third round of clean coal competition and directed the Energy Department to issue its solicitation by May 1, 1989.

The Clean Coal Technology Program is a government-industry effort to demonstrate advanced methods for using coal cleaner and more efficiently than today's technology. Begun by Congress in 1986 and expanded by President Reagan in 1987, the program is expected to finance more than \$5 billion of innovative projects when completed in the 1990s.

(MORE)

R-88-165



Proposals selected in the 1989 competition will join 29 other clean coal projects chosen by the department in the first two rounds of competition completed in 1986 and 1988. To date, total cost of the projects selected in the program amounts to nearly \$2.3 billion, with the private sector contributing just over 60 percent.

In a Federal Register notice announcing the public meetings published on December 14, 1988, the department outlined its objectives for the Clean Coal program. Included in the anticipated benefits was the demonstration of concepts that could not only reduce suspected acid rain-causing emissions but also, by significantly increasing the efficiency of power generation, produce perhaps 10 to 30 percent less carbon dioxide than conventional technologies.

In addition, new technologies sponsored by the program could offer increased reliability through modular approaches to electric power generation; benefit both eastern and western states by making available more economical, fuel flexible coal-burning systems; boost the nation's position in international trade by providing technology that increases the attractiveness of U.S. coal to foreign buyers; and by allowing the use of the nation's most abundant fossil fuel resource, enhance the long term energy security of the U.S.

All three meetings will follow the same format. Following program overviews by Energy Department officials, several concurrent discussion workshops will be held. Attendees will be asked to have informal, unstructured discussions with Energy Department panelists. At the conclusion of the discussion sessions, the recommendations presented will be summarized for all participants.

Each of the meetings will conclude with a presentation by DOE's Office of Procurement Operations on the rules and procedures to be followed in awarding and administering financial assistance. There will be an opportunity for questions on the procurement guidelines.

Individuals may attend the meetings without advance notification to DOE, and there is no registration fee or other charge for attendance. Written comments also may be submitted and will be considered if they are received by February 26, 1989, in the Office of Fossil Energy (Attn. Dr. C. Lowell Miller, FE-22), U.S. Department of Energy, Washington, DC 20585.

The public meetings will begin at 8:30 a.m. at the following locations:

January 18, 1989 -- Radisson Hotel Denver, 1550 Court Place, Denver, Colorado, 80202 (Tel: 303-893-3333)

February 2, 1989 -- Harvey Hotel-DFW Airport, 4545 W. John Carpenter Freeway, Irving, Texas 75063 (Tel: 214-929-4500)

February 16, 1989 -- Radisson Hotel Atlanta, Courtland and International Boulevard, Atlanta, Georgia 30303 (Tel. 404-659-6500)



**SUPPLEMENT TO THE FEDERAL REGISTER NOTICE**

**LETTER OF TRANSMITTAL TO PROSPECTIVE  
ATTENDEES**





**Department of Energy**  
Washington, DC 20585

December 14, 1988

**NOTICE OF MEETINGS;  
INVITATION FOR PUBLIC VIEWS AND COMMENTS ON THE CONDUCT  
OF THE CLEAN COAL TECHNOLOGY III SOLICITATION**

**Prospective Attendees:**

Enclosed for your information is a copy of the Notice of Meetings that appeared in the Federal Register of December 14, 1988. The Notice advises that written comments are welcome, either in lieu of, or in addition to, personal attendance at the meetings, but please note that your written submittal should be received by the Department of Energy (DOE) not later than December 30, 1988, in order to ensure its consideration by DOE in planning the agendas for the meetings.

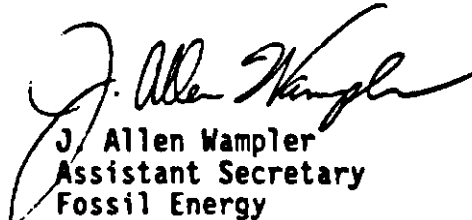
We have been successful in arranging for the hotels to offer reduced rates for accommodations. However, DOE cannot be of any assistance with your reservations, and your arrangements must be made directly with the hotels. You are reminded that DOE cannot reimburse those who attend the meetings or otherwise submit views for any expenses that may be incurred in responding to this Notice. It is important that you mention to the hotel that you are attending the DOE Clean Coal Technology meeting, and that you observe the deadlines listed below, after which dates the reduced rates may no longer be available:

Denver, Colorado, Wednesday, January 18, 1989, Radisson Hotel Denver.  
Tel. (303) 893-3333. Meeting Rates: \$49/single, \$58/double.  
Reservations must be made by: January 4, 1989.

Irving, Texas, Thursday, February 2, 1989, Harvey Hotel-DFW Airport.  
Tel. (214) 929-4500. Meeting Rates: \$74 single/double.  
Reservations must be made by: January 19, 1989.

Atlanta, Georgia, Thursday, February 16, 1989, Radisson Hotel Atlanta.  
Tel. (404) 659-6500. Meeting Rates: \$62/single, \$72/double.  
Reservations must be made by: January 23, 1989.

We look forward to seeing you in person. Thank you for your interest in DOE's Clean Coal Technology Program.

  
J. Allen Wampler  
Assistant Secretary  
Fossil Energy

Enclosure



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DEPARTMENT OF ENERGY  
FY 1989 CONGRESSIONAL BUDGET REQUEST  
CLEAN COAL TECHNOLOGY

OVERVIEW

Clean Coal Technology/Innovative Clean Coal Technology Program

Coal is the most abundant energy resource in the United States with recoverable reserves estimated to be 935 billion barrels crude oil equivalent (COE). However, petroleum and natural gas, whose proven reserves are estimated to be 28 billion barrels and 35 billion barrels COE respectively, are the most utilized fossil fuels in the U.S. energy consuming marketplace despite their significantly higher costs relative to coal. Even though oil and natural gas prices are projected to remain significantly higher than coal, their demand is expected to remain relatively the same as it was in 1984.

Coal is demand driven. The capacity exists to increase coal supplies to meet significant increases in demand. To make coal utilization more attractive, the Department of Energy and the private sector have been conducting research through proof-of-concept on a wide variety of coal technologies aimed at improving the economics of using coal, improving the environmental performance associated with its use and converting coal into forms that could allow it to be used as a lower cost substitute for oil and natural gas. One of the principal activities in the area of improving environmental performance and utilization efficiency is the Clean Coal Technology program.

The Clean Coal Technology Program is related to, but not directly a continuation of, the effort that was undertaken by DOE pursuant to Section 321 of the "Act Making Continuing Appropriations for Fiscal Year 1985," P.L. 98-473, 98 Stat. 1874. Section 321, which directed the Secretary of Energy to solicit from the private sector "statements of interest in, and proposals for projects employing emerging clean coal technologies," analyze the information received, and submit a report to Congress that "assesses the potential usefulness of each emerging clean coal technology... and ...identify the extent to which federal incentives, including financial assistance, would accelerate the commercial availability of these technologies." In response to the November 27, 1984, Program Announcement, 49 Fed. Reg. 46696, DOE received one hundred and seventy-five submissions with project values totaling over \$8 billion. On May 1, 1985, DOE submitted its findings in the "Report to Congress on Emerging Clean Coal Technologies" (DOE/S-0034).

In August 1985, the President signed into law H.R. 2577, "Making Supplemental Appropriations for the Fiscal Year Ending September 30, 1985, and for Other Purposes." The Conference Report 99-236 accompanying H.R. 2577 advised DOE to immediately begin the preparation of a competitive solicitation for cost-shared clean coal technology projects, to consult with the Environmental Protection Agency (EPA) on technologies traditionally supported by EPA and on environmental regulatory considerations, and provided guidelines for the preparation of the solicitation in addition to those cited earlier in the accompanying Senate Report 99-82.



On December 19, 1985, P.L. 99-190, "An Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1986, and for Other Purposes," was signed into law. This statute, among other things, provides funds to conduct cost-shared clean coal technology projects for the construction and operation of facilities that would demonstrate the feasibility of future commercial applications of such technology.

P.L. 99-190 made available a total of \$397.6 million for this program. These funds were distributed over a three year period as follows: \$99.4 million in FY 1986, \$149.1 million in FY 1987, and \$149.1 million in FY 1988. Funding is provided from the \$397.6 million for contracting, travel, and ancillary costs incurred by the Department of Energy for implementation of the Clean Coal Technology Program. P.L. 99-190 also requires a minimum of 50 per centum cost sharing by the private sector on each project, cost sharing in each phase of each project, constraints on valuation of "in-kind" cost sharing by the private sector, time limitations for issuing the solicitations, proposal preparation and project selection(s), among other things.

In accordance with the earlier guidance and P.L. 99-190 making funds available, the Clean Coal Technology program solicitation was issued on February 18, 1986, with a closing date of April 18, 1986. The 51 proposals that were received were evaluated and nine projects selected for negotiations on July 24, 1986. Negotiations were successfully completed with the sponsors of seven of these projects. Subsequent to the withdrawal from consideration of the two remaining projects by their sponsors, four replacement projects were selected for negotiation on October 7, 1987.

On March 18, 1987, the President made a decision to seek the full amount of the Government's share of funding recommended by the Joint Envoys on acid rain, Drew Lewis of the United States and William Davis of Canada. This decision will provide \$2.5 billion for demonstration of innovative control technologies over a 5-year period provided that appropriate projects are proposed that meet the program's cost-sharing requirements.

Consistent with this decision, the FY 1988 Appropriation provided \$50 million for a second solicitation with advanced appropriations of five hundred twenty-five million dollars for fiscal year 1989 to fund innovative clean coal technology projects. The development and demonstration projects are to be conducted in accordance with the already established cost-sharing guidelines of the Clean Coal Technology program. This will ensure that industry will invest an equal or greater amount over this period to stimulate development and deployment of innovative technologies for reduction of air pollution emissions. In FY 1989 advanced appropriations for the balance of the President's 2.5 billion five year program is being requested with five hundred and seventy-five million in FY 1990, six hundred million in FY 1991 and six hundred million in FY 1992.



DEPARTMENT OF ENERGY  
FY 1989 CONGRESSIONAL BUDGET REQUEST  
CLEAN COAL TECHNOLOGY  
(dollars in thousands)

LEAD TABLE

Clean Coal Technology

	<u>FY 1987 Actual</u>	<u>FY 1988 Approp.</u>	<u>FY 1989 Base</u>	<u>FY 1989 Request</u>	<u>Program Change Request vs. Base Dollar Percent</u>
CCT #1 (non-add)					
Cooperative agreements:					
Operating expenses .....	(\$145,273)	(\$147,112)	(\$147,112)	\$ ...	(\$-147,112) -100.0%
Small Business Innovative Research .....	(1,839)	...5/	...5/	...	n/a
CCT/ICT #2 (new BA)					
Cooperative Agreements:					
Operating expenses .....	...	31,488	31,488	511,000	+479,512 +1,522.8%
Small Business Innovative Research .....	...	...6/	...6/	...6/	n/a
Program Direction (non-add)	(1,988)	(1,988)	(1,988)	...	(-1,988) -100.0%
(New BA) .....	...	18,512	18,512	14,000	-4,512 -24.4%
Total CCT/ICCT Program:					
Non-add .....	(149,100)1/	(149,100)1/	(149,100)1/	...2/	(-149,000) -100.0%
New BA .....	...	50,000	50,000	525,000	+475,000 +950.0%
Staffing Total FTE's: Direct .....	0	0	0	0	
Indirect .....	0	45	45	58	

1/ Advanced appropriation from FY 1986

2/ Advanced appropriation from FY 1988

3/ Two FTE's are designated for ES&H Programs

4/ Three FTE's are designated for ES&H Programs

5/ \$1,839 K is proposed for FY 1988

6/ \$394 K is proposed for FY 1988 and \$6,388 K is proposed for FY 1989



DEPARTMENT OF ENERGY  
 FY 1989 CONGRESSIONAL BUDGET REQUEST  
 CLEAN COAL TECHNOLOGY  
 (dollars in thousands)

SUMMARY OF CHANGES

Clean Coal Technology/Innovative Clean Coal Technology

FY 1988 Appropriation ..... \$199,100

Cooperative Agreements

- o Provide for a second solicitation that will focus on projects to demonstrate technologies which are capable of retrofitting, repowering or modernizing existing coal using facilities utilizing the same policies and principles toward cost sharing as were adopted in the first clean coal technology solicitation and will seek to reduce information requirements where prudent ..... +311,900

Program Direction

- o Provides support, through advanced appropriations, for significantly greater number of second ICCT solicitations and subsequent selection of projects. Includes funding for salaries, benefits and travel expenses for 58 FTE's. This staff will support work in the Clean Coal Technology/Innovative Clean Coal Technology program. Activities include preparation of evaluations, status reports, presentations, environmental assessment studies as may be needed to be responsive to NEPA requirements and operational monitoring of programs as required to accomplish program objectives..... +14,000

FY 1989 Congressional Budget Request ..... \$525,000



DEPARTMENT OF ENERGY  
FY 1989 CONGRESSIONAL BUDGET REQUEST  
CLEAN COAL TECHNOLOGY  
(dollars in thousands)

KEY ACTIVITY SUMMARY

CLEAN COAL TECHNOLOGY/INNOVATIVE CLEAN COAL TECHNOLOGY

I. Preface: Clean Coal Technology/Innovative Clean Coal Technology (CCT/ICCT)

The initial goal of the program was, as stated in P.L. 99-190, "for the purposes of conducting cost-shared clean coal technology projects for the construction and operation of facilities to demonstrate the feasibility of future commercial operation." The Administration proposes to build on the existing program and expand the program to support the Joint Envoys recommendations on the demonstration of innovative control technologies over a five year period. P.L. 99-190 made available a total of \$397.6 million for this program. These funds were distributed over a three year period as follows: \$99.4 million in FY 1986, \$149.1 million in FY 1987, and \$149.1 million in FY 1988.

The FY 1988 appropriations reflects a continuation of the program as proposed in the President's March 1987 Acid Rain Initiatives message which requested an additional \$2.5 billion in spending over a five year period for innovative control technology demonstrations to be at least 50 percent cost shared by the participants. These demonstrations will be targeted to the criteria as specified in the Envoys' Report and amended based on advice from the Innovative Control Technology Panel or additional criteria mandated by Congress. The next solicitation is anticipated to provide financial assistance awards for projects that employ innovative control technologies capable of retrofitting or repowering existing facilities. Specifically, \$50 million was appropriated in FY 1988 and \$25 million in FY 1989 advanced appropriations for a second solicitation. The remaining \$1.775 billion is being requested as an advanced appropriation in FY 1989 to be used on subsequent solicitations with five hundred seventy-five million being made available in FY 1990, six hundred million in FY 1991 and six hundred million in FY 1992.

II. A. Summary Table:

Program Activity	FY 1987	FY 1988	FY 1989	% Change
Cooperative Agreements				
CCT-I	\$147,112	\$147,112	\$ 0	-100.0
ICCT	0	31,488	511,000	+1,522.8
Subtotal	\$147,112	\$178,600	\$ 511,000	+186.1
Program Direction				
CCT-I	\$1,988	\$1,988	\$ 0	-100.0
ICCT	\$0	\$18,512	\$14,000	-24.4
Subtotal	\$1,988	\$20,500	\$14,000	-31.7
Total Clean Coal Technology	\$149,100	\$199,100	\$525,000 1/	+163.7

1/ Advanced appropriation from FY 1988



# III. Activity Descriptions

	FY 1987	FY 1988	FY 1989
Program Activity			
Solicitation CCT-1 Cooperative Agreements	Continued negotiations on remaining cooperative agreements and initiated design and construction efforts on facilities for selected projects. (\$145,273)	Complete negotiations on all cooperative agreements, initiate construction on all projects selected in first CCT solicitation and begin operational test programs to produce data required. (American Electric Power, Babcock & Wilcox, EER, Energy Intl. Ohio-Ontario Clean Fuels, Pullman-Kellogg) (\$145,274) Proposed funding for Small Business Innovative Research program. (\$1,838)	Complete construction on many projects and initiate or continue operational test program for several development efforts utilizing prior year funding. (\$0)
	Continued activities related to cost overrun reserve fund utilizing prior year funding. (\$0) \$145,273	Cost overrun reserve fund has been utilized to increase number/amount of awards in first CCT solicitation (\$0) \$147,112	Cost overrun reserve fund has been utilized to increase numbers/amount of awards in first CCT solicitation. (\$0) \$0
Solicitation CCT/ICCT Cooperative Agreements	No activity. (\$0)	Select and implement industry/ Government funded projects for the clean use of coal that focus on retrofit, repowering or modernization of existing facilities. (\$31,094)	Continue projects resulting from the new solicitation for financial assistance that will focus on retrofit, repowering and modernization projects. (\$504,612)
	No activity. (\$0)	Proposed funding for Small Business Innovative Research program - (\$394)	Proposed funding for Small Business Innovative Research program. (\$6,388)
	\$0	\$31,488	\$511,000
Program Direction	Provided support for completing contract negotiations monitoring project design and construction effort. (\$688)	Continue support of work in progress to complete construction phase and to implement operational programs for projects in first CCT solicitation. Provided required support for significantly greater second CCT solicitation and subsequent selection of projects from large number of submissions. Initiated fact finding evaluation of project estimates. (Total \$5,785)	Continue support of operational test program projects in first CCT solicitation using prior year funding. Continue to provide required support for significantly greater second CCT solicitation and subsequent selection of projects from large number of submissions using prior year funding. (\$0)



### III. Activity Descriptions (cont'd)

Program Activity	FY 1987	FY 1988	FY 1989
Program Direction (cont'd)	Completed and delivered reports required in program authorizing legislation and prepared such evaluations, status reviews, presentations as may be required. Continued assessments activity. (\$680)	Increase the efforts necessary to prepare such evaluations, status reports, presentations, etc. as may be required to describe the expanded program and its progress to accomplishing the existing as well as added objectives. Implemented comparative effort to establish, on continuing basis, degree program supports intent of Special Envoys' Report. Initiated project technology, market assessments required to evaluate and direct the greater number of projects selected to demonstrate innovative control technologies. (\$5,985)	Continue efforts to prepare necessary evaluations, status reports, presentations, etc. as may be required to describe the expanded program and its progress to accomplishing the existing as well as added objectives. Continue project technology, market assessments required to evaluate and direct the greater number of projects selected to demonstrate innovative control technologies. Continue analysis of project data and results to ensure consistency with intent of Special Envoys' Report and program objectives. (\$5,940)
	Completed required assessment reports and initiated environmental monitoring activities. (\$620)	Continue environmental assessment studies and operational monitoring programs for projects selected in the initial CCT solicitation using prior year funds. Initiate expanded environmental evaluation and data acquisition program required to implement NEPA requirements for each of the increased number of projects as well as the expanded program. (\$4,750).	Continue environmental assessment studies and operational monitoring programs for projects selected in the initial CCT solicitation using prior year funds. Continue expanded environmental evaluation and data acquisition program required to implement NEPA requirements for each of the increased number of projects as well as the expanded program. (\$3,880)
	\$1,988	\$20,500	\$14,000
Total, CCT/ICCT	\$147,261	\$199,100	\$525,000

### IV. Construction Project Summary

None



**DEPARTMENT OF ENERGY INTERIOR AND RELATED AGENCIES APPROPRIATIONS  
FISCAL YEAR 1989**

**PUBLIC LAW NO. 100-446, SEPTEMBER 27, 1988, EXCERPT**



PUBLIC LAW 100-446—SEPT. 27, 1988

DEPARTMENT OF THE INTERIOR  
AND RELATED AGENCIES  
APPROPRIATIONS, FISCAL YEAR  
1989



## DEPARTMENT OF ENERGY

## CLEAN COAL TECHNOLOGY

For necessary expenses of, and associated with, Clean Coal Technology demonstrations pursuant to 42 U.S.C. 5901 et seq., \$575,000,000 shall be made available on October 1, 1989, and shall remain available until expended: *Provided*, That projects selected pursuant to a general request for proposals issued pursuant to this appropriation shall demonstrate technologies capable of retrofitting or repowering existing facilities and shall be subject to all provisos contained under this head in Public Laws 99-190 and 100-202 as amended by this Act.

The first paragraph under this head in Public Law 100-202 is amended by striking "and \$525,000,000 are appropriated for the fiscal year beginning October 1, 1988" and inserting "\$190,000,000 are appropriated for the fiscal year beginning October 1, 1988, and shall remain available until expended, \$135,000,000 are appropriated for the fiscal year beginning October 1, 1989, and shall remain available until expended, and \$200,000,000 are appropriated for the fiscal year beginning October 1, 1990": *Provided*, That outlays in fiscal year 1989 resulting from the use of funds appropriated under this head in Public Law 100-202, as amended by this Act, may not exceed \$15,500,000: *Provided further*, That these actions are taken pursuant to section 202(b)(1) of Public law 100-119 (2 U.S.C. 909).

101 Stat.  
1329-240.

For the purposes of the sixth proviso under this head in Public Law 99-190, funds derived by the Tennessee Valley Authority from its power program are hereafter not to be precluded from qualifying as all or part of any cost-sharing requirement, except to the extent that such funds are provided by annual appropriations Acts: *Provided*, That unexpended balances of funds made available in the "Energy Security Reserve" account in the Treasury for The Clean Coal Technology Program by the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in section 101(d) of Public Law 99-190, shall be merged with this account: *Provided further*, That for the purposes of the sixth proviso in Public Law 99-190 under this heading, funds provided under section 306 of Public Law 93-32 shall be considered non-Federal: *Provided further*, That reports on projects selected by the Secretary of Energy pursuant to authority granted under the heading "Clean coal technology" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, which are received by the Speaker of the House of Representatives and the President of the Senate prior to the end of the second session of the 100th Congress shall be deemed to have met the criteria in the third proviso of the fourth paragraph under the heading "Administrative provisions, Department Energy" in the Department of the Interior and Related Agencies Appropriations Act, 1986, as contained in Public Law 99-190, upon expiration of 30 calendar days from receipt of the report by the Speaker of the House of Representatives and the President of the Senate.

42 USC 5903d  
note.

Reports.



**CONFERENCE REPORT 100-862**

**TO ACCOMPANY PUBLIC LAW NO. 100-446, EXCERPT**



MAKING APPROPRIATIONS FOR THE DEPARTMENT OF  
THE INTERIOR AND RELATED AGENCIES FOR THE  
FISCAL YEAR ENDING SEPTEMBER 30, 1989, AND FOR  
OTHER PURPOSES

AUGUST 10, 1988.—Ordered to be printed

Mr. YATES, from the Committee of conference,  
submitted the following.

CONFERENCE REPORT

[To accompany H.R. 4867]

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

Amendment No. 131: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate with an amendment as follows:

*In lieu of the matter proposed by said amendment insert the following: For necessary expenses of, and associated with, Clean Coal Technology demonstrations pursuant to 42 U.S.C. 5901 et seq., \$575,000,000 shall be made available on October 1, 1989, and shall remain available until expended: Provided, That projects selected pursuant to a general request for proposals issued pursuant to this appropriation shall demonstrate technologies capable of retrofitting or repowering existing facilities and shall be subject to all provisos contained under this head in Public Laws 99-190 and 100-202 as amended by this Act.*

The managers on the part of the Senate will move to concur in the amendment of the House to the amendment of the Senate. The amendment provides \$575,000,000 in fiscal year 1990 for a third Clean Coal Technology procurement as proposed by the Senate, and clarifies that the procurement is for retrofit and repowering technologies and is subject to the cost-sharing provisions of the previous two procurements.

The managers agree that a request for proposals should be issued by May 1, 1989, with proposals due no later than 120 days after issuance of the request for proposals, and that the Secretary of Energy should make project selections no later than 120 days after receipt of proposals.

Amendment No. 132: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate with an amendment as follows:



Restore the matter stricken by said amendment, amended to read as follow: *The first paragraph under this head in Public Law 100-202 is amended by striking "and \$525,000,000 are appropriated for the fiscal year beginning October 1, 1988" and inserting "\$190,000,000 are appropriated for the fiscal year beginning October 1, 1988, and shall remain available until expended, \$135,000,000 are appropriated for the fiscal year beginning October 1, 1989, and shall remain available until expended, and \$200,000,000 are appropriated for the fiscal year beginning October 1, 1990": Provided, That outlays in fiscal year 1989 resulting from the use of funds appropriated under this head in Public Law 100-202, as amended by this Act, may not exceed \$15,500,000: Provided further, That these actions are taken pursuant to section 202(b)(1) of Public Law 100-119(2 U.S.C. 909).*

The managers on the part of the Senate will move to concur in the amendment of the House to the amendment of the Senate. The amendment changes the availability of \$525,000,000 originally made available for fiscal year 1989 in Public Law 100-202 by making \$190,000,000 available in 1989, \$135,000,000 available in 1990, and \$200,000,000 available in 1991 and also provides an outlay ceiling in fiscal year 1989. The House had proposed \$100,000,000 in fiscal year 1989, \$225,000,000 in fiscal year 1990, and \$200,000,000 in fiscal year 1991, and the Senate struck the House language.

Both of these changes are necessary because of budget allocation constraints, but neither action has an effect on the execution of the Clean Coal program, or on the Congress' overall support for the program, as is evidenced by additional appropriations provided for a third procurement of technologies.

The managers agree that administrative contract expenses may be incurred up to the budget level of \$9,820,000, but caution that close control of such expenditures is necessary to assure that the outlay ceiling provided will be sufficient to cover project costs.

Amendment No. 133: Modifies public law citation as proposed by the Senate.

Amendment No. 134: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate which clarifies that funds borrowed by REA Electric Cooperatives from the Federal Financing Bank are eligible as cost-sharing in the clean coal technology program.

Amendment No. 135: Reported in technical disagreement. The managers on the part of the House will offer a motion to recede and concur in the amendment of the Senate which specifies clean coal projects may proceed 30 calendar days after receipt by Congress of required reports, provided the reports are received prior to the end of the 100th Congress.



**5(c)**

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**SENATE REPORT 100-410**

**TO ACCOMPANY PUBLIC LAW NO. 100-446 EXCERPT**



DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES  
APPROPRIATIONS BILL, 1989

JULY 6, 1988 —Ordered to be printed

Mr. BYRD, from the Committee on Appropriations,  
submitted the following

## REPORT

[To accompany H.R. 4867]

## DEPARTMENT OF ENERGY

## CLEAN COAL TECHNOLOGY

1988 appropriation.....	\$50,000,000
1989 budget estimate.....	\$25,000,000
House allowance.....	100,000,000
Committee recommendation.....	\$25,000,000

<sup>1</sup> Made by advance in Public Law 100-202.

The Committee recommends an appropriation of \$525,000,000, the same as the budget estimate and an increase of \$425,000,000 above the House allowance.

In addition, the Committee recommends an advance appropriation of \$575,000,000 for fiscal year 1990, the same as the budget estimate for that year and an increase of \$350,000,000 over the House allowance. The Committee has not, at this time, recommended advance appropri-



ations of \$600,000,000 each for fiscal years 1991 and 1992 as requested by the administration. The Committee does expect to consider and fully appropriate these requested funds in a subsequent appropriation bill.

A table detailing the budget estimates and the recommendations of the multiyear Clean Coal Technology Program, as related to the joint envoys' report, is provided below:

[In thousands of dollars]

Fiscal year	Budget estimate	House allowance	Committee recommendation
Prior years .....	150,000	150,000	150,000
1988 .....	50,000	50,000	50,000
1989 .....	525,000	100,000	525,000
1990 .....	575,000	225,000	575,000
1991 .....	600,000	200,000	
1992 .....	600,000		
Total .....	2,500,000	725,000	1,300,000

The appropriation recommended by the Committee for fiscal year 1990 is consistent with the President's request in his fiscal year 1989 budget to the Congress. The appropriation will enable the Secretary of Energy to conduct a third clean coal technology solicitation for demonstration projects pursuant to the authorities provided under the Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577). This action is consistent with the President's decision to seek the full amount of the Government's share of funding recommended by the joint envoys on acid rain. This recommendation will provide total appropriations to date of \$1,300,000,000 for demonstrations of innovative control technologies in concert with the envoys' report.

Selection of projects subsequent to the third Clean Coal Technology Program solicitation shall be based on the same criteria employed in the solicitation, as amended, that was released by the Department on February 22, 1988.

Within the overall funds provided for clean coal technology, the Committee understands that no more than \$14,000,000 will be obligated for program direction expenses in fiscal year 1989.

The fiscal year 1988 appropriation (Public Law 100-202), which provided \$50,000,000 along with advanced appropriations of \$525,000,000 for fiscal year 1989, was directed to fund a second solicitation of clean coal technology demonstration projects primarily focused upon the demonstration of emerging clean coal technologies capable of retrofitting or repowering existing facilities.

The House has recommended that \$425,000,000 of the fiscal year 1989 advanced appropriation be reappropriated in the following manner: \$225,000,000 for fiscal year 1990 and \$200,000,000 for fiscal year 1991. The Committee strongly opposes this recommendation.

While it is the Committee's understanding that such action, as recommended by the House, should not affect the authority of the Department of Energy to enter into contracts to obligate the total \$525,000,-



000, along with the \$50,000,000 appropriated in fiscal year 1988, for projects selected pursuant to the second solicitation now ongoing in the Department, the action of the House could send the private sector a very confusing signal as to the continued support of the Congress. Furthermore, by moving the majority of the advanced appropriations from fiscal year 1989 to fiscal years 1990 and 1991, budget ceilings in those latter fiscal years will be tightened just when decisions are required about additional appropriations for the clean coal program in order to fully fund the President's \$2,500,000,000 clean coal program. Finally, this recommendation by the House could be interpreted by Canada as a clear signal that the United States does not intend to fund the clean coal program in amounts already promised nor to proceed with the program in the timeframe agreed upon.

The Committee is aware of the continuing debate over proposals to impose additional regulatory controls affecting the emission of air pollutants from the use of coal. The decision whether or not to impose such requirements should not prevent the development of new clean coal technologies which promise to permit the use of coal in a cost-effective and environmentally acceptable manner.

If the clean coal program were preempted because of the requirements of a new regulatory scheme, industry and the Nation would be left with current technology that is neither as efficient nor cost-effective in generating electricity or controlling emissions as many new clean coal technologies. Timely development and widespread use of new clean coal technologies, however, can provide the Nation with improved methods by which to achieve more effective emission reductions while providing less costly electricity to ratepayers or energy to industrial users of coal. Given a chance, DOE has estimated that new clean coal technologies could save consumers and business billions of dollars annually in lower electricity rates.

In May 1988, industry submitted 54 clean coal technology projects to the DOE totaling more than \$5,300,000,000 in total project costs. Proposed projects would be located in 20 different States. Two-thirds of the submissions made to the DOE propose the demonstration of clean coal retrofit technologies and the other one-third of the submissions would demonstrate repowering technologies. Industry has also proposed to spend more than \$3,000,000,000 in private funds, while seeking slightly more than \$2,000,000,000 from the Government. With only \$536,000,000 actually available for commitment to projects selected under this second solicitation, the clean coal projects already proposed by industry far exceed the amount of available funding. Clearly there is more than adequate private sector interest in additional clean coal technology demonstrations to justify the single \$575,000,000 solicitation which the Committee is recommending for fiscal year 1990.

The Committee intends that a general request for proposals be issued no later than January 1, 1989. Proposals are due no later than 120 days after issuance of the request for proposals and the Secretary of Energy must make project selections no later than 120 days after receipt of proposals.



The Committee expects the Secretary to select projects that assure the demonstration of a diversity of technologies utilizing both high- and low-sulfur coals. Such project selections should not be confined to any specific geographic region of the country. While it is not the intent of the Committee to seek support for identical projects, the Committee understands from testimony received during congressional hearings that a particular technology may require multiple demonstrations of the same or similar technology at varying locations, using different coals, and involving different applications or equipment configurations. Design margins and equipment redundancy are systematically reduced as operational confidence and reliability are established. Succeeding projects of this nature are likely to entail fewer risks to the participants in the project as the technology evolves to one which has acceptable commercial risks. In this situation, such projects should require lesser amounts of Federal financial assistance.

In sum, the Committee intends that Government assistance may be provided to the extent necessary to assure the commercial maturity of various promising technologies so that new clean coal technologies will be available for use in the 1990's and beyond.

The Committee has retained House-passed bill language which makes it clear that a provision in Public Law 99-190, which requires at least 50 percent non-Federal cost sharing should not be construed to prevent the Tennessee Valley Authority from using its nonappropriated power authority revenues as cost sharing for projects under the Department's Clean Coal Technology Demonstration Program. Likewise, similar funds in other quasi-Federal operations are also eligible to be proposed as cost-sharing moneys under the sixth proviso of Public Law 99-190.



**HOUSE REPORT 100-713**

**TO ACCOMPANY PUBLIC LAW NO. 100-446, EXCERPT**



100TH CONGRESS  
2d Session

HOUSE OF REPRESENTATIVES

REPORT  
100-713

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DEPARTMENT OF THE INTERIOR AND RELATED  
AGENCIES APPROPRIATIONS BILL, 1989

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JUNE 20, 1988.—Committed to the Committee of the Whole House on the State of  
the Union and ordered to be printed

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Mr. YATES, from the Committee on Appropriations,  
submitted the following

REPORT

together with

ADDITIONAL VIEWS

[To accompany H.R. 4867]

DEPARTMENT OF ENERGY

CLEAN COAL TECHNOLOGY

The Committee recommends changing the availability of the \$525,000,000 of funds made available for fiscal year 1989 in the fiscal year 1988 appropriation for clean coal technology, contained in Public Law 100-202. The recommendation would make \$100,000,000 available in fiscal year 1989, make \$225,000,000 available in fiscal year 1990 and make \$200,000,000 available in fiscal year 1991. This change has no effect on the pace of the clean coal program, based on obligations anticipated by the Department of Energy. The Committee strongly supports this program and expects to give active consideration to additional appropriations in fiscal year 1990 and beyond to continue this important national effort.

While the Committee does not recommend additional advance appropriations for fiscal years 1990 through 1992 totaling \$1,775,000,000 as requested by the Administration, neither this action, nor the change in availability of funds for the existing pro-



curement is to be interpreted as lack of support for the program. This action is necessary to comply with strict budget guidelines and will have no effect on the execution of the program. It is the Committee's intention to continue to support this program to the extent necessary to assure the introduction of new and efficient technology to burn coal cleanly in the 1990's and beyond.

In order to assure that Congress has sufficient information upon which to base future decisions with regard to program funding, the Committee expects the Department to provide a report by March 1, 1989 which at a minimum provides (1) a summary of the projects and technologies selected in each of the first two procurements; (2) the status of the selected projects; (3) a completion schedule for each project, including estimates of the timing of commercial availability of the technology assuming successful demonstration; and (4) an analysis of technology areas that are not represented sufficiently in the first two procurements.

In providing funds for clean coal technology in fiscal year 1986 and in fiscal year 1988, Congress provided that cost-sharing by individual projects, mandated to be no less than 50 percent, could not be made up of other Federally appropriated funds. It was assumed that this would not preclude the Tennessee Valley Authority (TVA), which did participate in the proposal process, from being able to use funds derived from receipts from its power program as cost-sharing if TVA so desired. Subsequently, a disagreement has arisen between TVA and DOE as to whether part of a 1985 Comptroller General's decision on a bid protest regarding a TVA contract affects the ability of TVA power funds to qualify for cost-sharing purposes under the clean coal program. TVA has been involved in many innovative coal technology programs and is a legitimate potential participant. Therefore, the Committee has included language in the bill to clarify that TVA power funds (except to the extent that any such funds were provided by an annual appropriations Act) are eligible to meet cost-sharing requirements under programs included within the "clean coal technology" account.

As requested by the Administration, the Committee recommends bill language providing for the merger of previously appropriated funds from the "Energy security reserve" with this account.

The Committee also expects administrative contract funds to be limited to \$5,000,000 in fiscal year 1989 instead of \$9,820,000. This reduced level is still one-third higher than 1988 estimates of requirements which were based on a larger program. These costs should be controlled closely so that most of the appropriations go directly to projects. If additional funds are required, they may be requested through the reprogramming process.



**DEPARTMENT OF ENERGY NEWS RELEASE OF NOVEMBER 9, 1988**

**"DOE SCHEDULES WESTERN MEETING TO  
INCREASE PARTICIPATION IN CLEAN  
COAL TECHNOLOGY PROGRAM"**



# FOSSIL ENERGY SPEECHES

U.S. DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

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## Clean Coal Technology

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### The Role of the West

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*Remarks by  
J. Allen Wampler  
Assistant Secretary  
for Fossil Energy  
U.S. Department  
of Energy  
to the Public Meet-  
ing on Western  
Participation in the  
Clean Coal Program  
in Cheyenne,  
Wyoming  
December 2, 1988*

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Our purpose is to determine what can be done to increase western participation in the Clean Coal Technology Program. You might say that this is the kick-off of the formal process that will culminate in the issuance of the 3rd Clean Coal solicitation next spring—specifically, by next May.

We have organized this meeting for one specific reason—because we did not get enough Western proposals in the 2nd round of competition, and because given the funding we had available, we could only select one from those that we did receive that was west of the Mississippi River.

Now let me say right from the start that the fact that only one Western project was selected does not mean that the majority of those not selected were bad proposals. They were not. We had an incredible number of high-quality proposals—quite likely more of a high caliber than most of us expected and certainly more than we had funding for. But by the time that funding was allocated, the selected projects were concentrated largely in the East.

We want to spend most of our time today listening to those of you who represent western interests. We want to know, quite simply, what obstacles you saw in the 2nd Clean Coal competition—what precluded more involvement from the West. We want to hear what we can do to remove those obstacles.



## Fossil Energy Speeches

And we hope that by listening to what you say and having others hear your opinions—perhaps we will see some concrete action both from the government and by you in industry that will increase the role of western projects in the program beginning next spring.

Now obviously, we can't hear you tell us all these things if we are the ones doing the talking. So my remarks this morning will be brief. What I would like to do is to give you a somewhat broader overview. I would like to spend a few minutes describing what we hope to gain from the Clean Coal program—and why our goals apply both to the East and the West.

Let me start with a 30-second capsule history of the program.

Congress began the program in late 1985 primarily as a way of boosting commercial prospects for coal. The criteria for Round #1—carried out at the direction of Congress—specified that the initial round of competition—at that time, the only round of competition—was for all U.S. coals in all market applications.

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*We selected 16 projects totalling nearly \$1.3 billion—about \$537 million of that will be federal funding...only one of those projects was from the West.*

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At the same time Congress was providing us its initial direction, the U.S. and Canadian Special Envoys delivered their recommendations on an acid rain response program. They called for a \$5 billion innovative control technology demonstration effort that would be cost-shared by government and industry.

The President endorsed the Envoys' report in 1986 and in 1987, he called for an expansion of the Congressional Clean Coal program in a manner consistent with the Special Envoys' recommendations. The round of competition that we just completed was the first carried out in direct response to the President's call for an expanded effort. It attempted to conform, as fully as practicable, to the Special Envoys' guidance.

We selected 16 projects totalling nearly \$1.3 billion—about \$537 million of that will be federal funding. As I said, only one of those projects was from the West.

Now quite obviously, the Special Envoys placed a high priority on reducing transboundary air emissions released from high sulfur coal-burning plants. And they were particularly con-



cerned about older plants—the ones that did not fall under existing Clean Air Act emission requirements. But did the Special Envoys require that all plants funded under the program be in the East?

I think a reading of the language of the Envoys' report tells you that the answer is "no." Let me read you those criteria—and I'm quoting directly from the Envoys' report:

"The federal government should co-fund projects that have the potential for the largest emission reductions, measured as a percentage of SO<sub>2</sub> or NO<sub>x</sub> removed. Among projects with similar potential, government funding should go to those that reduce emissions at the cheapest cost per ton.

"More consideration should be given to projects that demonstrate retrofit technologies applicable to the largest number of existing sources, especially existing sources that, because of their size and location, contribute to transboundary air pollution....

Furthermore, special consideration should be given to technologies that can be applied to facilities currently dependent on the use of high-sulfur coal." — Unquote.

Now I've emphasized a few of the Special Envoys' words—namely, have the potential for, are applicable to, can be applied to.

The Special Envoys, by using those words, I believe, were indicating that the most important goal of this program was to put into place a new generation of clean coal technologies—not simply to build a group of specific demonstration plants at specific locations.

While they indicated that there should be some near-term reductions in acid rain precursor emissions from these facilities, it is clear that demonstration plants were not the ultimate goal. More important was that new technology be developed that could be applied to the problem of acid rain and contribute to its solution.

The Clean Coal Technology Program is exactly that. It is a demonstration program. By itself, it is not going to solve the acid rain problem. But it will demonstrate the technologies that

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*The Special Envoys...were indicating that the most important goal of this program was to put into place a new generation of clean coal technologies—not simply to build a group of specific demonstration plants at specific locations.*

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can, ultimately, solve the problem.

I firmly believe that we can retain the spirit—and the letter—of the Special Envoys guidelines by siting projects in both the East and the West.

Now, the question is "when we reduced the Special Envoys recommendations to procurement-related criteria, did we tilt the scales?" Or is the issue more one of perception. Did people look at the origins of the program—see that it was a response to acid rain concerns—translate that into an Eastern emphasis—and decide that there was no point in submitting a proposal?

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*I don't want to see the Clean Coal Technology Program used as a wedge to separate the coal industry. I'm convinced that we are entering a period in this country where literally everything we do will be measured by the consequences it has for the environment.*

---

Or perhaps, a corollary to that is "Was there too much cost entailed in putting together a proposal that prospective Western proposers decided that it wasn't worth the financial investment, given perhaps the misperceptions of the program's intent?" I've put a task force together in our office to look specifically at the question of proposal costs.

Or was it more difficult for the Western coal producer to develop teaming arrangements with architect-engineering firms, equipment manufacturers, and so on?

That's what we want to know today. It is important that we have this information when we start putting together the next solicitation. And that effort will begin within the next few weeks.

And it is important for a much larger reason also.

I don't want to see the Clean Coal Technology Program used as a wedge to separate the coal industry. I'm convinced that we are entering a period in this country where literally everything we do will be measured by the consequences it has for the environment.

Acid rain, CO<sub>2</sub>, the quality of our environment in general—all of these issues will become of paramount importance to the American public. But so too will be economic growth, cost of living, the security and reliability of energy supplies, and the quality of life in our society.



It won't be an argument over whether we should use more eastern or western coal, but over whether we should be using any more coal at all. It will be a "growth versus no-growth" argument. And that affects all of the coal industry.

We have the opportunity today to head off that debate. We can put into place a program that returns major dividends to this country.

It is a program that can break the link between concerns over acid rain and increased coal use. It can take us a step toward a CO<sub>2</sub> response program by putting into place more efficient coal technologies.

It can give us a new generation of power options that can help us sidestep the possible electricity shortfall we see coming in the next few years. And it can put us in a position to use the energy resource we have in most abundance without having to put men in danger to protect vital sea lanes and shipping routes.

But it is a program that will succeed only if it involves the full participation—and support—of all of the coal industry. How we get that participation and support depends largely upon how candid you are about our program and the ways it can be improved. And the success of that program will depend upon your initiative in moving beyond this meeting and forming the teaming arrangements and putting together the proposals that can be contenders in the next round of competition.

That's why we are here today. And that's why we are pleased that you have joined us.

---

*It won't be an argument over whether we should use more eastern or western coal, but over whether we should be using any more coal at all. It will be a "growth versus no-growth" argument. And that affects all of the coal industry.*

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**TRANSCRIPT OF PROCEEDINGS ON DECEMBER 2, 1988**

**MEETING ON INCREASING WESTERN  
PARTICIPATION IN THE 1989 CLEAN  
COAL TECHNOLOGY SOLICITATION"**



# **TRANSCRIPT OF PROCEEDINGS**

U.S. DEPARTMENT OF ENERGY

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In the Matter of:

MEETING ON INCREASING WESTERN PARTICIPATION  
IN THE  
1989 CLEAN COAL TECHNOLOGY SOLICITATION

Pages: 1 through 81

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(9:22 a.m.)

Good morning, Ladies and Gentlemen. Welcome to our public meeting on the Clean Coal Technology Program. We're very sorry for the delay. We did want to start right on time, but we're overwhelmed with the interest in this meeting and very happy to see so many people who are interested in the subject we're going to discuss today.

J. Allen Wampler was sworn in as the Department of Energy's Assistant Secretary of Fossil Energy in October of 1986. He had been nominated in this position by President Reagan in August of 1986, and was confirmed by the U.S. Senate in October of 1986.

As Assistant Secretary for Fossil Energy, Mr. Wampler manages the Federal Government's coal, petroleum, and natural gas technology programs, as well as the



1 Strategic Petroleum Reserve and Naval Petroleum and Oil  
2 Shale Reserves. Of course, among his responsibilities is  
3 the oversight of this program, the national Clean Coal  
4 Technology Program that we'll be discussing in more detail  
5 throughout the day.

6 So, with that I'm pleased to have Allen Wampler  
7 join us this morning.

8 MR. WAMPLER: Thank you, Jack.

9 Good morning. It is my pleasure to welcome you  
10 also here today. I'm very pleased to see the size of the  
11 crowd. I hope in good Western tradition we all checked our  
12 guns at the door before we came in.

13 Our purpose here today is very simple. It's to  
14 determine what we can do to increase participation in the  
15 Clean Coal Technology Program by Western groups. This is  
16 the kickoff of a formal process that will last over the next  
17 several months that will culminate in the issuance of our  
18 third solicitation for the Clean Coal Technology Program.  
19 Specifically, that solicitation will be issued in May.

20 We've organized this meeting for one specific  
21 reason. We did not get enough Western proposals in the  
22 second round of competition, and because of the funding we  
23 had available we could only select one that was west of the  
24 Mississippi River that would receive funding.

25 Let me say right from the start that the fact that



1     only one Western project was selected doesn't mean that the  
2     majority of the projects that were submitted from the West  
3     were bad proposals. They were not. We had an incredible  
4     number of high quality proposals submitted in this round,  
5     and quite likely more of a high caliber than any of us  
6     expected, and certainly more than we had funding for. We  
7     probably could have funded double the amount of project that  
8     we did fund, but as a result of the time that the funding  
9     was allocated, the selected projects were concentrated  
10    largely in the eastern part of the U.S.

11           We want to spend most of our time today in  
12    listening to those of you who represent Western interests.  
13    We want to know quite simply what obstacles you saw in the  
14    clean coal competition, what precluded more involvement from  
15    the West, and more importantly, we wanted to know what we  
16    can do to remove those obstacles, and we hope by listening  
17    to what you say and having others hear your opinions,  
18    perhaps we can see some concrete action by those in the  
19    Government and those of you in industry that will increase  
20    dramatically the role of Western projects in the program  
21    that we're beginning this spring.

22           Now, obviously we can't hear you tell us all these  
23    things if we're doing all the talking, so my remarks this  
24    morning are going to be brief. Jack Siegel, who introduced  
25    me, my Deputy of Coal Technology, will review the specific



1 content of the program in a few minutes.

2 What I'd like to do is give a somewhat broader  
3 overview for a very few minutes. I'd like to spend that  
4 little time describing what we hope to gain from the Clean  
5 Coal Technology Program, and why our goals apply equally to  
6 the East and West, and let me start with about a 30-second  
7 capsule of the history of the program.

8 Congress began this program in late 1985,  
9 primarily as a way of boosting commercial prospects for  
10 coal. Criteria for our projects in Round 1 were carried out  
11 by the direction of Congress, and specified that in the  
12 initial round the competition was to be for all coals and  
13 all market applications.

14 At the same time the Congress was providing us  
15 that initial direction, the U.S. and Canadian special envoys  
16 delivered the recommendations on an acid rain response  
17 program. They called for a five-billion-dollar initiative  
18 that would be carried out in clean coal that would be cost  
19 shared by Government and industry on at least a 50/50 basis.

20 In 1986 the President endorsed that report, and in  
21 1987 he called for an expansion of the Congressional Clean  
22 Coal Program in a manner that was consistent with the joint  
23 envoys' recommendations. The round of competition that we  
24 just completed was a produce of that. It was carried out in  
25 direct response to the President's call for that expanded



1 effort, and it attempted, as fully as practicable, to  
2 conform to the guidelines and the guidance of the special  
3 envoys.

4 We selected 16 projects. Most of you know they  
5 total \$1.3 billion. About 530 million of that was in the  
6 form of Federal funding, and as I said earlier, only one of  
7 those projects was from the West.

8 Quite obviously the envoys placed a very high  
9 priority on reducing transboundary air pollution that was  
10 released from high-sulfur coal-burning plants, and they were  
11 particularly concerned about older plants, the ones that  
12 didn't fall under the existing Clean Air Act requirements,  
13 but the question is: Did the special envoys require that  
14 all plants funded under the program be in the East?

15 If you have read the special envoys' report, the  
16 answer to that is categorically, "No." Let me read a little  
17 bit of that criteria and quote directly from the envoys'  
18 report. I quote:

19 "The Federal Government should co-fund projects  
20 that have the potential for the largest emission reductions,  
21 measured as a percentage of SOx/NOx removed, and should go  
22 to those that reduce emissions at cheapest cost per ton.  
23 More consideration should be given to projects that  
24 demonstrate retrofit technologies applicable to special  
25 funding sources, especially sources that, because of their



1 size and location, contribute to transboundary air  
2 pollution. Furthermore, special consideration should be  
3 given to technologies that can be applied to facilities  
4 currently dependent on the use of high-sulfur coal,"  
5 unquote.

6 Now, I've emphasized some of those words, namely  
7 "that have the potential for," or, "can be applicable to,"  
8 or, "can be applied to," for very special reasons. The  
9 special envoys, in using those words, made it very clear  
10 that the most important goal of the program was to put into  
11 place a new generation of coal technologies, not simply to  
12 build a group of specific demonstration plants at a specific  
13 location.

14 And, while they indicated that there should be  
15 some near term reduction in the acid rain precursor  
16 emissions, from the facilities that, with demonstration  
17 plants, it's clear that the demonstration plants were not  
18 the ultimate goal of the envoys's report. What was more  
19 important was that we develop all the technologies that  
20 could be applied in their commercial form to the problem of  
21 acid rain, and could contribute to their solution, and the  
22 Clean Coal Program is doing exactly that.

23 It's a demonstration program. By itself it  
24 certainly will not clear the acid rain problem, but it can  
25 demonstrate the technologies that can ultimately, in their



1 commercial form, solve the problem, and I fully believe that  
2 we can retain the spirit and the letter of the guidelines  
3 that were given to us by the special envoys by siting  
4 projects equally both in the West and the East.

5 The question is, when we reduce the special  
6 envoys' representations to what we call procurement-related  
7 criteria as the way we select projects, did we tilt the  
8 scales, or did we have an issue that's more of a perceptual  
9 issue than a real issue? Did people look at the origins of  
10 the program, translate that into an emphasis that they  
11 thought was in the East, and decide that they thought there  
12 was no real point in submitting a proposal if it was going  
13 to be for the Eastern projects alone?

14 Perhaps corollary to that is: Was there too much  
15 cost entailed in putting together a proposal? Is it that  
16 prospective Western proposers decided it wasn't worth the  
17 financial investments, given perhaps the misconceptions that  
18 the program was intended to be an Eastern program?

19 I put a task force together in our office to look  
20 specifically at this Western problem, and to look more  
21 specifically at the question of what it cost to put together  
22 proposals.

23 I was amazed to hear some of the costs that  
24 proposers and prospective proposers told me that they were  
25 getting involved with when they were trying to put one of



1     these proposals together, and if there's any way that we can  
2     do it legally, any way we can do it from a practical sense,  
3     I guarantee you the cost will be lower in putting proposals  
4     together in Round 3.

5             We also have a question if it has been more  
6     difficult for Western proposers to develop teaming  
7     arrangements with architect firms, material firms, and so  
8     forth. That's the reasons you'll see a distribution of  
9     people at this meeting that will include those groups, and I  
10    would hope that as the day goes on these groups could get  
11    together, have conversations, and those conversations bear  
12    fruit.

13            That's basically what we want to know today. It's  
14    important that we have this information when we start  
15    putting our solicitation together, and that's going to  
16    happen immediately. We'll go through the next few weeks in  
17    putting the basics together. That will culminate in May  
18    when we go out in the street with a new PON for Round 3 of  
19    Clean Coal Technology.

20            It's important that we hear what's being said and  
21    we get some result from what's being said today for a much  
22    larger reason. I don't want to see the Clean Coal Program  
23    used as a wedge to separate the coal industry.

24            I'm convinced that we're entering into a period in  
25    this country where literally everything we do is going to be



1 measured by the consequences it has on the environment.  
2 Acid rain, CO2, the quality of our environment in general,  
3 all these issues are going to become of paramount importance  
4 to the American public, but on the other side, too, will  
5 economic growth, cost of living, the security and  
6 reliability of our energy supplies, and quality of life in  
7 our society.

8 I'm afraid it won't be an argument over whether we  
9 should use more Western or Eastern coal, but whether we  
10 should be using more coal at all. It will be a growth  
11 versus no-growth argument, and that affects everybody in the  
12 coal industry. I think we have the opportunity to head off  
13 that debate, or I think we can put into place a program that  
14 will produce some very positive results in this country.

15 It's a program that can break the link between  
16 acid rain and increased use of coal. It can take us a step  
17 toward CO2 reduction by putting into place much more  
18 efficient technologies, which result in more effective  
19 burning. It can give us important options to side-step what  
20 we see coming in the next few years, and that's a very  
21 serious shortfall in electrical generation. The bottom line  
22 is that the Program can put us in a position to use the most  
23 abundant resource that we have in this country without  
24 having to put men and women in danger in vital sea lanes in  
25 the world to protect crude oil.



1           But, it's a program that will succeed only if we  
2   have full participation and full support of all the coal  
3   industries, East and West. How we get that participation  
4   and support depends largely on how candid you are with us  
5   today; how candid you are in telling us ways that we can  
6   improve our program; how candid you are in telling us ways  
7   that we can produce circumstances under which you will  
8   participate in the program; in identifying ways that you  
9   will agree to form teaming arrangements and put together  
10  proposals that can be contenders in that next round of  
11  competition that starts in May.

12           So, the bottom line, that's why we're here today.  
13  We want your candid opinions. We were incredibly pleased  
14  that so many of you joined us and have checked your guns at  
15  the door, and I'll look forward to a very productive day to  
16  work with you and to work together to solve this problem  
17  that we have. Thank you very much. (9:37 a.m.)

18           MR. SIEGEL: Thank you very much, Allen.

19           For those of you who don't know who I am, I am  
20  Jack Siegel, Allen's Deputy Assistant Secretary for Coal  
21  Technology. Allen assigned me the responsibility for the  
22  implementation of the Clean Coal Technology Program, among  
23  other things, and therefore, even though I am accompanied by  
24  some of our key people from the DOE's Washington  
25  Headquarters, and Morgantown and Pittsburgh Energy



1 Technology Centers who are very intimately involved in this  
2 program, if you feel a need to protest the way we have  
3 implemented the program so by throwing rotten tomatoes, or  
4 rotten eggs, or furniture, or whatever I'm the right target.

5 There are two reasons for this. Number one, as I  
6 mentioned before, I am the person responsible for  
7 implementing this program, and number two, I think it would  
8 be best if you only had one target for all you rotten food  
9 since it will be easier for the people here at this hotel,  
10 who have been very hospitable so far, to clean up the mess  
11 afterwards.

12 But seriously, we are here today for very serious  
13 business. We do have a major hole in our Clean Coal  
14 Technology Program, and if somebody would please turn on the  
15 slide projector I have a cartoon here that I think describes  
16 best the problem that we have.

17 As you can see, in the first two rounds of the  
18 Clean Coal Program, very few of the projects proposed, and  
19 even fewer of the projects selected, have come from west of  
20 the Mississippi River. This is in spite of the fact that  
21 coal is spread throughout the country, and as a matter of  
22 fact more than half of the coal reserves in this country are  
23 from west of the Mississippi River.

24 What we have decided to do with respect to this  
25 meeting, to best insure that we understand what the problems



1 have been with the program so far, and what suggestions you  
2 have for dealing with those problems, and hopefully changing  
3 that scale, better balancing it for Clean Coal 3.

4 This morning I'll give a very brief presentation  
5 to provide the status of the Clean Coal Program, and to make  
6 sure that everybody here is working on a level playing field  
7 with respect to what the program is all about, and what the  
8 criteria were so far in carrying out the program.

9 I'll then be followed by Randy Wood, who will be  
10 representing the viewpoint of the Western States in giving  
11 us some thought on the Western issue.

12 Following Randy will be two Western energy  
13 leaders, David Williams and Gary McDowell, who will give us  
14 the Western perspective from an industrial viewpoint, and  
15 then we'll break up into discussion groups, which is really  
16 the meat of the meeting, where we will have an opportunity  
17 to hear from you the suggestions you have for improving the  
18 program.

19 We'll then get back together later this afternoon,  
20 and the moderators for the breakout sessions will summarize  
21 what they've heard, and give you an opportunity to correct  
22 any misperceptions that they may have had.

23 So, with that let me quickly run through the  
24 status of the Clean Coal Program and bring you all up to  
25 date on it.



1           This chart, which is very, very hard for all of  
2   you to see, I'm sure, lays out the several segments of the  
3   Clean Coal Program. The program is basically built upon an  
4   initial \$400 million that was appropriated by Congress back  
5   in 1985 and added to by the Presidential proposal in 1987  
6   for an additional two and a half billion dollars of Federal  
7   funds over a five-year period.

8           Clean Coal I, CCT I, as we call it here, was  
9   utilizing the \$400 million that Congress first appropriated  
10   back in 1985, and we have issued that solicitation. We have  
11   made selections, and I'll talk a little about that program  
12   in just a minute.

13          Clean Coal II was the first phase of the  
14   President's Clean Coal Program. It represented \$575 million  
15   of Federal funds. That program has also resulted in project  
16   selections.

17          What we're here to discuss today, then, is the  
18   rest of the program, Clean Coal III, IV, and V, and maybe  
19   beyond. Congress has already advance appropriated in Fiscal  
20   Year 1990 \$575 million for us to issue a third solicitation  
21   in May of next year, and I'll talk a little more about that  
22   as well.

23          In addition, the President has requested  
24   additional funds of about \$1.2 billion to carry out the  
25   remainder of the program in the future.



1           Now, with respect to the Clean Coal Technology I  
2 Program, as Allen Wampler mentioned, that program, designed  
3 by Congress, was intended for advanced coal technologies  
4 that could be utilized for all energy markets, for all  
5 market applications, to utilize the full coal resource base,  
6 and of course to be responsive to environmental concerns.

7           Now, I'm sure most of you know that this program  
8 is a cost-shared program. In fact, it's intended to be an  
9 industrial program where industry is the one that designs  
10 and carries out the projects, the Department of Energy helps  
11 reduce the risk by cost-sharing in the program.

12           The Federal Government, by law, can provide no  
13 more than 50 percent of the cost of any of these  
14 demonstration programs. That includes the design,  
15 construction, and testing phases.

16           In the first Clean Coal Program, we've selected 11  
17 projects which represent a diversity of technologies, a  
18 diversity of applications, a diversity of coals. Nine of  
19 those projects are in various stages of development. Some  
20 are still in the design state. Some are in the construction  
21 stage, and some are actually operating.

22           I won't go through those this morning. All of you  
23 were sent packages of information that described these  
24 projects, and for those of you who are interested, we can  
25 provide you with a lot more information on these projects.



1           Nine of these projects, the ones I showed on the  
2   first chart, and those on the second chart, have been  
3   negotiated. We actually have contracts with these firms  
4   now, and now it's jut a matter of carrying out those  
5   programs.

6           We still are negotiating two projects. We hope to  
7   complete the negotiation with these two firms very quickly.

8           A principal problem that we ran across in Clean  
9   Coal I was private-sector financing. Although it was made  
10   very clear in the solicitation that the Federal Government  
11   could provide only 50 percent of the cost of these projects,  
12   when push came to shove, several of the proposers found that  
13   they were having difficulty getting financing, and getting  
14   their teams together.

15          These two projects are still in a negotiation.  
16   For the first Clean Coal Program for the \$400 million that  
17   were provided by the Federal Government, \$800 million were  
18   put into the program by private industry. So CCT I is a  
19   \$1.2 billion program, and rather than the maximum 50-percent  
20   of the cost share that the Federal Government said they  
21   would provide, actually we have only had to provide 33  
22   percent, which is really headed in the right direction.  
23   We're glad to see that.

24          Clean Coal II, or the Innovative Clean Coal  
25   Technology Program, is a program that was a little more



1 focused than Clean Coal I. As Mr. Wampler mentioned, this  
2 program was an outgrowth of discussion that took place  
3 between the U.S. and Canada, and a lot of the criteria for  
4 the solicitation were a direct result of those negotiations.

5 This program was \$575 million of Federal funds,  
6 and it was, as you can see, to demonstrate advanced coal  
7 technologies that were capable in their commercial form, and  
8 I want to emphasize that again, as Allen did, in their  
9 commercial form of retrofitting or repowering existing  
10 boilers. There was no limitation on where these plants  
11 could be located, nor was there any limitation on whether or  
12 not green fields plants could be built, or whether they  
13 would be located at existing facilities.

14 You can see from this slide the focus of the  
15 solicitation. It was aimed at the control of sulfur dioxide  
16 and nitrogen oxides, and on the cheapest removal of those  
17 pollutants, and there was a focus, too, on technologies  
18 that, in their commercial form, would be applicable not only  
19 to existing plants, but plants that burned high-sulfur coal.

20 Now, as a result of that program we have selected  
21 about \$1.3 billion-worth of projects. So again, for the 500  
22 or so million dollars that the Federal Government put in, we  
23 got well in excess of 60 percent private sector cost-sharing  
24 in this phase of the program as well.

25 A variety of technologies were selected. Most of



1 the technologies selected, 13 out of the 16, are  
2 technologies for the retrofit of power plants for the  
3 control of sulfur dioxide and nitrogen oxides.

4 Again, in your briefing materials we have some  
5 summary information on each of these 16 projects. These  
6 projects were just selected a couple of months ago, and  
7 we're right now in the negotiation process.

8 We hope to have negotiations completed on all of  
9 these projects within six months, and we feel pretty  
10 confident of meeting this goal because we made a number of  
11 improvements from the second solicitation from the  
12 administrative side that we think will ease the negotiation  
13 process for Clean Coal II.

14 Here's the remainder of the list of 16 projects  
15 that we selected. I thought it would be useful to show a  
16 comparison of the types of technologies that were selected  
17 between Clean Coal I and II. It might help in some of the  
18 discussions later this morning and this afternoon.

19 In Clean Coal I, out of the 11 projects we  
20 selected, only two of them were pure pollution control  
21 technologies, and they were for the combined control of  
22 sulfur and nitrogen oxides. As you can see, in Clean Coal  
23 II, 12 of the projects selected are pollution control  
24 technologies that would either control nitrogen dioxide,  
25 sulfur, or the combination of two pollutants. You can also



1 see in the middle, integrated gasification combined cycle,  
2 and atmospheric and pressurized fluidized bed combustion.  
3 Those technologies can be used to repower, or can be used in  
4 grass roots applications for new power generation.

5 You see no advanced combustion, no coal  
6 liquefaction, no underground coal gasification, or other  
7 types of projects selected under Clean Coal II, so the  
8 criteria clearly had some influence on the types of projects  
9 that were selected in Clean Coal II.

10 Our plans for Clean Coal III will be guided by  
11 some guidance we received from Congress, and some of this  
12 chart is wrong, I should point out. Congress did advance  
13 appropriate \$575 million. Again, the Federal Government  
14 can't put up any more than 50 percent.

15 Congress did tell us that the solicitation was for  
16 technologies that, again, in their commercial form could be  
17 used to retrofit or repower existing facilities. Congress  
18 told us to use the same guidance they gave us both for Clean  
19 Coal I and for Clean Coal II, so there's some judgment  
20 involved as to how to implement the program, and of course,  
21 we're looking for any advice you have.

22 I should point out that for CCT III Rural Electric  
23 Administration and Tennessee Valley Authority funds are  
24 eligible as cost-sharing. Now, previously Tennessee Valley  
25 Authority, who wanted to participate in the program, was



1 told that all funds that the Tennessee Valley Authority had  
2 were considered Federally appropriated funds and therefore  
3 could not be counted as their 50-percent share.

4 As a result, there was a real limitation of TVA's  
5 involvement in the program. The same thing held true with  
6 rural electrics, who received funding from Rural Electric  
7 Administration.

8 Congress cleared this up for this solicitation.  
9 Congress also told us, if you skip down now to the schedule,  
10 that we were to issue the solicitation by May 1 of next  
11 year; that you would have 120 days to submit proposals, and  
12 we would have 120 days after that to make the selections, or  
13 by the end of December of next year.

14 Our plans for the program, again just skipping  
15 down to the bottom, of course we're going to comply with the  
16 Congressional guidance. We intend, though, to have a series  
17 of public meetings, this being the first, to get the  
18 public's input on the solicitation process, and to learn  
19 more from you as to how we can improve the programs, not  
20 only to be responsive to the Western concerns that I'm sure  
21 all of you have, but also procedural things that exist  
22 within the solicitation.

23 We're adding something new to our public meetings  
24 after this Cheyenne meeting, and that is we're going to have  
25 a session devoted to the Department of Energy's procurement



1 process where those of you who have not dealt with the  
2 Department of Energy before can learn more about it and ask  
3 questions about our procurement process.

4 As you can see, the meetings are scheduled for the  
5 dates shown. There will be a Federal Register notice issued  
6 within the next few weeks providing all of the information  
7 on the meetings. We'll be sending out to those on our  
8 mailing list, which will include all of you now, copies of  
9 that Federal Register notice.

10 Now, one last thing I would like to go through  
11 before I move on, and as Allen mentioned, it's you we want  
12 to hear from, and I'm sure you don't want to hear too much  
13 from us, but I thought it would be of value to walk through  
14 some of the differences between the evaluation criteria that  
15 were used for Clean Coal I and Clean Coal II. It might  
16 provide some more information to be used in the breakout  
17 sessions.

18 Both CCT I and II were divided into several  
19 sections. Qualifications criteria were criteria, in most  
20 part responsive to Congressional requirements, that had to  
21 be met in your proposal. If you failed to meet one or more  
22 of these, your proposal was automatically eliminated from  
23 consideration in the program.

24 I don't think there's much point in discussing  
25 these. They're very straight-forward, and so I'll just pass



1 on to the next. If your proposal made it through  
2 qualification round, then it was evaluated in detail by our  
3 source evaluation board.

4 The proposals were divided into several pieces,  
5 the first piece being the technical piece. The technical  
6 piece was divided into two sections, one that looked at the  
7 technology in its commercial form, and that's the criteria  
8 that are shown here.

9 I should point out that there is a pretty  
10 significant difference between the criteria that were used  
11 in Clean Coal I and Clean Coal II in this area, in the  
12 commercialized technology area, and you'll see there's a  
13 heavy influence from the Lewis-Davis recommendations.

14 The next element of the technical evaluation dealt  
15 with the demonstration plant itself; what were the  
16 environmental implications at the site and what work was  
17 going to be done at the demonstration site.

18 There is one major difference between Clean Coal I  
19 and II in this regard, and that deals with the amount of  
20 sulfur and nitrogen oxides that would be reduced, and that  
21 was a distinct criterion in Clean Coal II that was not in I.

22 There was also a business and management part of  
23 each proposal that was submitted that dealt with the  
24 financing of the project, the team that had to be put  
25 together to carry out the projects, and a few other things.



1 Really no major differences between Clean Coal I and Clean  
2 Coal II there, except that in Clean Coal II, financing, the  
3 extent to which you had gotten commitments on financing was  
4 much more important in Clean Coal II than it was in Clean  
5 Coal I.

6 We wanted a little better feel, and in fact we got  
7 a lot of comments from the public in the public meetings we  
8 had last year on this program, that it would be best to give  
9 more emphasis on the financing. Finally there was a cost  
10 evaluation conducted. The cost criteria dealt with how much  
11 the project would cost totally, and what was it going to  
12 cost the Department of Energy.

13 There were also factors called "program policy  
14 factors." These factors enabled us to meet the goals and  
15 objectives of the program, but these factors were beyond  
16 your control.

17 Congress told us, and the Lewis-Davis criteria  
18 told us that we should select a diversity of technologies so  
19 one program policy factor dealt with selection of a  
20 diversity of technologies. In addition, there are several  
21 others that are here.

22 I should point out that the big difference between  
23 Clean Coal I and Clean Coal II is that it's the very last  
24 tick under the first bullet, that there should be some  
25 collective near-term reduction of transboundary air



1 pollution of sulfur dioxide and nitrogen oxide from the  
2 projects selected.

3 Well, I think that this brings you up to date on  
4 the program. Now I'd like to get into the issue at hand.

5 Our first speaker this morning is Randy Wood.  
6 Randy is the Director of the Wyoming Department of  
7 Environmental Quality.

8 Randy also is a member of the Department of  
9 Energy's Advisory Committee to Clean Coal Technology  
10 Program, and in fact has been quite influential in helping  
11 us guide that program. As I mentioned earlier, he will be  
12 discussing this program from a Western state perspective.

13 (9:58 a.m.)

14 MR. WOOD: Thank you, Jack, and I think I probably  
15 ought to do a little Chamber of Commerce work first. We're  
16 very pleased that you're here in Wyoming today. We did not  
17 organize this weather especially for you. We just wanted  
18 you to know that this is how it is all the time here, and  
19 keep that in mind and bring your business to Wyoming.

20 I want to welcome you here today. We are happy to  
21 have you all here. Governor Mike Sullivan has asked me to  
22 say to you that he's especially pleased that this meeting is  
23 here. He's especially pleased about the indication that he  
24 had that there were going to be 30 to 40, 50 people here,  
25 and I know that he would be extremely pleased to see the



1 real turnout that's here today.

2 This is an extremely important issue to him, to  
3 the State of Wyoming, as well as to the other, western  
4 states around here. He asked me to pass on to you his  
5 apologies for not being able to be here today. He is in  
6 coal country, Wyoming. He's in Gillette today, taking care  
7 of some other business. It seems he has more things to do  
8 than he has time to do, but he did want me to welcome you  
9 here.

10 The statement that I'm going to present, and it's  
11 actually directed to the Department of Energy, is presented  
12 on behalf of the Honorable Mike Sullivan, Governor of the  
13 State of Wyoming.

14 Department of Energy's initiative in seeking  
15 information on how to increase Western participation in the  
16 Clean Coal Technology Program is both admirable and  
17 encouraging. However, this initiative, in seeking this  
18 input, cannot be an empty process designed or functioning  
19 simply to hear the concerns of Western states and Western  
20 interests.

21 Based upon the history of the clean Coal  
22 Technology awards, it is clear that the past process has  
23 been a technology development subsidiary for Eastern high-  
24 sulfur coal interests and States. If a clean coal  
25 technology development program is truly to be a national



effort, and I might add parenthetically that the public has been assured that this is the case by us against Western coals, which has been evident in the past awards, must be eliminated.

While the West is not naive enough to believe that all interests are equally treated individually, we firmly believe in the doctrine of equality. We firmly believe that this doctrine has been violated in the Clean Coal Proposals that you had to date.

The Clean Coal Technology Advisory Panel recommended to the Energy Secretary, Herrington, a set of criteria for evaluation of the projects, which was a fair and eloquent balance of all interests, both national and international, East and West, consumers and producers, emitters and receivers. This proposed criteria was reflected in the subsequent program opportunity notice for Clean Coal II, implying that it was a fair balance in the view of the Secretary of Energy.

However, something seems to have happened between the design of the product and the actual manufacture of the product. I say this appears to have happened, because we only have the final results to view and have been denied access to the actual evaluations. It is apparent to me that the criteria which was used in the evaluation process was either discarded or modified.



1           Because of the tremendous importance to the State  
2 of Wyoming of the Clean Coal Technology Program, I attended  
3 a debriefing conducted by the Department of Energy on an  
4 unsuccessful western proposal with optimism that the  
5 debriefing would pinpoint deficiencies in the proposals and  
6 thus offer opportunities for improved proposals in the  
7 future. Being an optimist, it was my belief that we should  
8 learn from our past in order to improve in the future.

9           I was extremely disappointed during that  
10 debriefing exercise. What I saw was a bureaucratic process  
11 designed to deny evaluation of any meaningful data or  
12 information which could be useful to me or the proposer.  
13 The process was artfully crafted to assure that no one could  
14 cry, "Foul."

15           However, one thing did come out, and that was  
16 extremely disturbing to me. The Department of Energy  
17 debriefing board clearly states that a proposal which would  
18 produce an enhanced low sulfur Western coal would not  
19 receive high marks if it would displace Eastern sulfur, if  
20 it would displace Eastern high-sulfur, Eastern coal, since  
21 credit would not be given for emissions reductions produced  
22 by fuel switching to this enhanced low-sulfur Western coal.

23           The Board based this determination on a provision  
24 in the Lewis-Davis accord, which was designed to minimize  
25 social disruption in Eastern coal producing region. This



issue was discussed in the Innovative Clean Coal Technology Advisory Panel, but the final recommendation to Secretary Herrington clearly did not advocate such a bias against low-sulfur Western coal projects.

Additionally, the evaluation criteria and the program policy factors contained in Section 5 of the Program Opportunity Notice are devoid of such a bias. The Program Opportunity Notice sets forth fairly clear criteria and program policy factors against which the proposals were to be evaluated, but it is apparent that the evaluation team incorporated an additional economic disruption disqualification criteria which made it impossible for Western projects to succeed.

Therefore, in answer to DOE's question as to how to encourage projects, the State of Wyoming's major proposal is to eliminate the bias against Western projects based on Eastern association and economic issues, and therefore level the playing field. So long as the perception of such a bias exists, Western interests will be discouraged, implicitly, if not explicitly.

Through the working groups which will labor the rest of the day, I'm confident that other suggestions will be put forth -- but in my opinion these will all be in vain if this one major obstacle which I've outlined is not first torn down. Once again we here in the West, since DOE's



1       desire to encourage Western states' participation in this  
2       very important process, are pleased to answer any question  
3       which you might have.

4                   Thank you. (10:06 a.m.)

5                   MR. SIEGEL: Thank you, Randy. I appreciate that.  
6       You've given us a lot of food for thought already for this  
7       morning.

8                   Our next speaker is David R. Williams, Jr. Mr.  
9       Williams is a Director of the Williams Companies. He's  
10      currently also Chairman of the Board of Williams  
11      Technologies, Incorporated, Integrated Carbons Corporation,  
12      Carbon Resources, Incorporated, and is Managing Partner of  
13      Resource Technology Associates.

14                  Mr. Williams is Chairman of the Board of Western  
15      Resources Transport, which is currently developing a coal  
16      slurry pipeline project from Wyoming to Long Beach. Mr.  
17      Williams is Chairman and CEO of Black Meso Pipeline,  
18      Incorporated, the only operating coal slurry pipeline in the  
19      Western Hemisphere.

20                  He's also a director and one of the founders of  
21      American Water Development, a Denver land and water  
22      development company.

23                  Mr. Williams has a long list of other  
24      accomplishments, from Air Force combat in World War II, to  
25      past directorships of a wide variety of corporations. He's



1 obviously very well qualified to give us his thoughts on the  
2 Western coal perspective.

3 Mr. Williams. (10:07 a.m.)

4 MR. WILLIAMS: Thank you, Secretary Siegel.

5 Ladies and Gentlemen, my modest operation doesn't  
6 qualify me, certainly, as a spokesman for the industry, but  
7 this invitation to criticize, comment upon the problem of  
8 Western coal projects, and the absence of success of Western  
9 coal projects, is certainly one that I couldn't miss the  
10 opportunity of joining in and participating in the comments  
11 that are being solicited here today.

12 I think Secretary Siegel mentioned the rotten eggs  
13 and tomatoes. I don't think we're going that far, but I  
14 certainly think we all have some concern, and this  
15 opportunity to make the CCT program interactive and  
16 responsive. Whether we can get that message through to the  
17 Congress or not, at least it's an extraordinary opportunity,  
18 and I think DOE is to be commended for this sort of meeting,  
19 where our comments will be heard.

20 It's wonderful to be here in the banana belt of  
21 Wyoming to get away from the cold weather in Oklahoma, and  
22 Wyoming, of course, is the premier coal-producing state in  
23 our country. Wyoming has more energy than Saudi Arabia.

24 I think that Wyoming, with this status, is not  
25 recognized in the Congress, or in Washington, the way that



1 West Virginia is. Nevertheless, it's great to be here with  
2 you, and I will spare you the 12-page speech that my office  
3 has prepared for me, and try to highlight some of the points  
4 that we have in mind.

5 From a Western viewpoint, with the drought in the  
6 energy industry being what it is, we're all in a state of  
7 distress. In our case, we've just gotten our business back  
8 on its knees, and they say that the difference in someone  
9 involved in the energy business in the West, and a bird, is  
10 that a bird can still make a deposit on a Mercedes.

11 I think it should be commented that, obviously  
12 from this presentation, that the DOE CCT programs has been  
13 mandated by Congress, and that we have the good fortune of  
14 having, in the Office of Fossil Fuels, a very fine and  
15 capable organization, so some of these criticisms and  
16 tomatoes that we're throwing today are really aimed at what  
17 has been prescribed by Congress, and I think that the Fossil  
18 Fuels group is trying to accommodate what we have to say.

19 The original concept of the Clean Coal Technology  
20 Program had an element of national security, and as you can  
21 see from this presentation, it's almost entirely now focused  
22 on air quality.

23 I think that we in the West think that backing out  
24 foreign oil imports is terribly important. Where Wyoming  
25 has, in addition to many other coal reserves, 60 percent of



1 the enormous Powder River Basin coal reserve.

2 The largest body of energy in the world lies in  
3 Wyoming. It's a very low-sulfur coal. It's ideal for  
4 utilities. It has a disadvantage in distance, as most coals  
5 in the West do. It's too far from the market.

6 It has high moisture content, and when you remove  
7 the moisture, you have a problem of reabsorption and  
8 tendency to spontaneous combustion. Those are technologies  
9 that would do a lot to extend the economic radius of Wyoming  
10 coal.

11 That radius is prescribed by rail rates, and the  
12 great growth in Wyoming coal production over the last 15  
13 years, where it went from less than 10 million tons to more  
14 than 140 million tons per year, and then topped out in the  
15 last five years, has a lot to do with the radius, the  
16 economic radius, which it can reach.

17 This coal line also is virtually incapable of  
18 reaching California markets, not only because of the rail  
19 rates, but present technology on scrubbers and the Air  
20 Quality Resources Act of 1974 in California has made it  
21 almost impossible to burn coal in California, so while we're  
22 looking at acid rain as a primary objective of the Clean  
23 Coal Technology Program, we should keep in mind that we in  
24 the West look at the West Coast markets of California and  
25 other West Coast states as one that we ultimately would like



1 to achieve.

2 There are a lot of technologies that need to be  
3 developed in that regard, and I think that is equivalent to  
4 the acid rain. We don't have any Canadians or New  
5 Englanders complaining about coal in California, but  
6 certainly there are technologies that will make it possible  
7 to burn coal in California.

8 The DOE supported clean coal projects of cool  
9 water is one example.

10 The other aspect of broadening the radius for  
11 Western coal, not just Wyoming, but other states, is that we  
12 sell almost no American coal to the Pacific. The Pacific is  
13 the largest growing market for steam coal. Metallurgical  
14 coal has topped out, and of course follows the steel  
15 industry, but this growing market is being served by others,  
16 and I think that has a lot to say for ways in which we can  
17 get Western coal into that Pacific market.

18 The comments that we might make about the clean  
19 coal technology are primarily that they have in addition to  
20 being totally focused upon air quality and emissions  
21 control, they also have concentrated more on the combustion  
22 and post-combustion treatment and flue gas technologies.

23 One of the thoughts that some of us in the West  
24 have is that more emphasis should be made upon the pre-  
25 treatment of coal. That can be done at the mine more



1 cheaply, where space and labor cost are more favorable.  
2 The pre-treatment technologies, there are many that are  
3 available, but we notice that very, very few are among those  
4 that have been selected to this point.

5           The other point is that Western coals are going to  
6 require some newer technologies. Most of the technologies  
7 developed and accepted so far in the program have been  
8 directed at higher sulfur Eastern coals, and we believe that  
9 some of the special technologies that are required to solve  
10 the problems of Western coal are newer and less mature  
11 technologies.

12           I think that this means that we have to look at  
13 support for technologies that are not yet ready for  
14 retrofit. I'm not suggesting that DOE get into the business  
15 of sponsoring research, because that is an area for other  
16 agencies, but at least those technologies that have been  
17 proven in extensive pilot tests, and that pose a special  
18 solution for Western coals should be considered.

19           I think that DOE has made some beginning in that  
20 regard, and in that they are evaluating some of these  
21 emerging technologies outside of the CCT program. I think  
22 the idea of evaluating these technologies is a very good  
23 one. It doesn't necessarily commit DOE to sponsoring or  
24 supporting these technologies, but it does identify those  
25 that may be needed in the future.



1           In essence, we're saying that Western coal is  
2 different. It's lower sulfur. It has more moisture,  
3 usually more calcium, and it has the problem of distance to  
4 get to markets.

5           We would like to see that more attention be given  
6 to this. I'm happy to hear that there is thought on helping  
7 on the proposal preparation cost. We have made several  
8 proposals in our research efforts and teaming arrangements  
9 with matching funds, and I think that we know from  
10 experience that it's a very expensive and arduous task to  
11 prepare a good proposal. I think that we need help, and I'm  
12 glad to hear that that is being considered.

13           We think that the slurry pipeline is a solution  
14 for Western coal and its problem of distance. While inland  
15 transportation is something that is not immediately a  
16 subject of these programs, there are new technologies in  
17 slurry work for pumping and transporting a direct-fired  
18 coal/water mixture in which the coal/water mixture work  
19 supported by DOE actually is integral with the coal slurry  
20 work that is being carried on. This also brings up the  
21 situation that we found before about the preparation and the  
22 transportation and the burning and the cleanup are all  
23 integral, and that what you do in one place is a tradeoff of  
24 what you do in another place.

25           If slurry pipelines could become more prevalent,



1 and of course we've had an example of one that was worked  
2 for ten years. We still think the era will come from where  
3 slurry transportation will solve some of these penalties to  
4 Western coal.

5 It certainly means that doing a pre-treatment at  
6 the mine for reducing emissions, for reducing the grinding  
7 required and the preparation cost at the power plant, can be  
8 done cheaper at locations near the source, and we will find  
9 that slurry transportation becomes an integral part of this  
10 process at some point along the road.

11 I guess we're saying that we in the West are quite  
12 aware that almost two-thirds of the Congress come from east  
13 of the Mississippi. We're aware of the fact that 50 percent  
14 of the coal reserves of the nation are west of the  
15 Mississippi, and that is just the proven and economically  
16 producible coal.

17 That doesn't take into account the Powder River  
18 Basin, for example, which probably has as much reserves as  
19 most of the rest of the U.S. coal reserves, some of which  
20 may not be economically producible, some of which have not  
21 been cored or drilled, so it could well be that more than  
22 half of the U.S. coal reserves lie west of the Mississippi.

23 It's another point to say that we in the Western  
24 coal industry have an obligation here. DOE is extending  
25 cooperation, and there is a great lethargy in the coal



1 industry. Most of the coal companies, and I've been  
2 involved in one or two, have the feeling that downstream  
3 involvement in facilities that go beyond the mining and  
4 loading of rail cars, are not something that at this point  
5 in time, with low energy costs, prices, that should involve  
6 coal companies. I think we would like to see coal companies  
7 step forward and respond more to these initiatives by DOE.

8 One could look at the oil industry in say 1950,  
9 when the role of oil was rather small, and the international  
10 network of world oil, the trading relationships, and the  
11 infrastructure of the facilities were rather modest, and we  
12 should recognize that technology was what gave the U.S. its  
13 leadership in developing world oil. U.S. found most of the  
14 major basins in the world, developed most of the marketing,  
15 the refining, the transportation, and most of the trading  
16 relationships.

17 That has changed, of course, dramatically, with  
18 explorations and nationalizations, but it still gives the  
19 U.S. an enormous position in world oil. It was technology  
20 driven. Some day we see that coal will be technology  
21 driven, and technologies are just beginning to emerge. Coal  
22 will likely go through a refining step, just as oil does  
23 today. This is not going to be soon.

24 This will result in specification products, and  
25 substitutes for petroleum products. It will then mean that



1 coal will be marketed and distributed more like oil is  
2 today. Certainly coal companies have to think in the long-  
3 term about what this means to their involvement in down-  
4 stream facilities.

5 I think that we have another situation in the  
6 West, and in that we have an additional disadvantage with  
7 the smaller populations in our Western coal-producing states  
8 in acquiring the matching funds. We notice that the  
9 matching funds from Ohio and Illinois and some of the coal  
10 states that have more of a high-sulfur problem is, those  
11 have been more successful in the CCT program, so I think  
12 that we would look to the States as being more involved, and  
13 certainly Wyoming has been very much involved and very  
14 supportive.

15 I should close by saying that this is an  
16 extraordinary opportunity. I think that Secretary Wampler,  
17 in inviting an interacting type of response with industry,  
18 is one that we should not fail to react and respond to.  
19 I urge the industry to make this a more effective program,  
20 and it's only our fault that we don't come forward with the  
21 ways that we see that this program will allow solutions to  
22 the Western coal industry. Thank you very much.

23 (10:26 a.m.)

24 MR. SIEGEL: Thank you, Mr. William. I greatly  
25 appreciate that.



1           Our next speaker is Gary McDowell. Gary is the  
2 Vice President of the Western Operations for Amax Coal  
3 Company. He's responsible for operations, training,  
4 personnel, safety, training, and business development for  
5 the Western Division.

6           Mr. McDowell joined Amax Coal Company in 1975 as a  
7 training instructor, and since then he's held numerous  
8 positions in Amax field locations, including Director, Human  
9 Resources for the company's Western Division. He returned  
10 to Indianapolis in 1981 as Vice President of Human  
11 Resources.

12           During the past year Mr. McDowell worked on a  
13 three-man team which negotiated a five-year agreement  
14 between the Bituminous Coal Operators' Association and the  
15 United Mine Workers of America. Also, in April of 1988, Mr.  
16 McDowell represented the United States at the International  
17 Labor Organization in Geneva, Switzerland, where 17  
18 countries negotiated issues pertaining to the mining  
19 industry.

20           Mr. McDowell is a graduate of Indiana University  
21 and Southeastern Illinois College, and prior to joining Amax  
22 he was employed with Allied Chemical as a safety director.

23           He and his family reside in Gillette, Wyoming.

24           We're very pleased to have Mr. McDowell with us  
25 today. Thank you. (10:27 a.m.)



1 MR. McDOWELL: Thank you, Jack.

2 As Jack said, my name is Gary McDowell. I've Vice  
3 President for Western Operations for Amax Coal, and I'm  
4 headquartered in Gillette, Wyoming, Amax Coal is a  
5 subsidiary of Amax Coal Industries. We are pleased to be  
6 here today to present the views of a mining company to DOE.

7 As I understand it, the purpose of this meeting is  
8 to seek out ways in which we might increase the number of  
9 Western projects proposed for Clean Coal Technology  
10 demonstration funding. I don't pretend to have all the  
11 answers, but perhaps I can point to a few things that might  
12 improve the process and help in some small way to increase  
13 the number of Western projects proposed for the next Clean  
14 Coal Solicitation. I do not represent my views to be the  
15 views of the entire Western coal industry. However, I feel  
16 that the concerns of my company will parallel those of other  
17 Western producers.

18 Much of what I have to say here today is probably  
19 familiar to most of you, and perhaps even touches on  
20 earlier, so I hope that you'll bear with me, but for a  
21 moment let me tell you a little about our company.

22 Amax, Inc., the parent company of Amax Coal  
23 Industries, is a world-wide supplier of metals, as well as  
24 distributor of value-added metals. The company's principal  
25 businesses are aluminum, gold, molybdenum, and coal. Alumax,



1       Inc., a wholly-owned subsidiary, is the third largest  
2       integrated aluminum company in the United States.

3               Amax Coal Institute is the nation's third largest  
4       coal producer, producing around 36 to 40 million tons a  
5       year.

6               Amax Gold is the twenty-sixth largest gold  
7       producer in the U.S. and is expanding. Amax also has  
8       significant investment through Amax Metals Company, and a  
9       growing natural gas production distribution business.

10              Amax's primary production facilities are located  
11      in the United States, but it supplies and sells throughout  
12      the world.

13              Amax entered the coal business in 1969 with the  
14      purchase of the Ayshire Collieries, a modest Midwest coal  
15      producer. In the portfolio of undeveloped reserves  
16      controlled by Ayrshire there was a block of Federal coal  
17      located in the Powder River Basin of Wyoming.

18              Quite frankly, in those early years the  
19      individuals in the home office in Indianapolis didn't think  
20      much of that coal deposit, but in a few years a handful of  
21      visionary men and women decided to take a chance and gamble  
22      some of the money to develop the coal in the Powder River  
23      Basin, and if you go back and read that justification, it  
24      was called an "experiment," an experiment to see if coal in  
25      the region could be produced and marketed profitably.



1.           At that time there was only one small mine-mouth  
2       operation producing coal in the Powder River Basin. In  
3       fact, the entire State of Wyoming production was only 11  
4       million tons in 1972. In 1973 Amax opened the Belle Ayr  
5       Mine and provided low-cost, low-sulfur subbituminous coal.

6           Amax put a lot of time and effort into selling  
7       this coal to skeptical utilities, equipment manufacturers,  
8       and even railroads, and I think that's an understatement. I  
9       can remember when we talked to vendors. They laughed at us,  
10      and then they called General Motors and told them, and they  
11      laughed at us, but we all sat down and talked about it, and  
12      the response was overwhelming, and we soon were expanding  
13      the operation. Others would soon join us: Exxon, Arco,  
14      Shell, Sun, Mobil, and others, in developing large-scale  
15      mining operations in the Powder River Basin.

16          Well, what produced that phenomenal growth? What  
17      was the attraction to this little-known coal basin? Quite  
18      simply it was clean coal. Clean coal, low-sulfur coal, low-  
19      ash coal, not only here in Wyoming in the Powder River  
20      Basin, but throughout the West. Clean coal, low-sulfur coal  
21      to meet the requirements of the Clean Air Act of 1970.

22          A second reason that Western coal grew can be  
23      attributed to the energy crisis in 1973 and 1974, when this  
24      nation turned increasingly to coal to fulfill its energy  
25      needs and bolster our energy security.



1           Energy security and environmental responsibility  
2   are two touchstones of this nation's energy priorities and  
3   policies. And coal in the East and in the West had, has  
4   played a leading role. I'd first like to talk to the topics  
5   of energy security.

6           Coal is the largest energy resource in the United  
7   States. There are presently 480 billion tons in proven  
8   reserves in the U.S. This is equivalent to 1.8 trillion  
9   barrels of oil, and enough coal to last for hundreds of  
10   years at current production rates. Two hundred sixty  
11   billion tons of that reserve are located west of the  
12   Mississippi, and right here in the State of Wyoming we have  
13   a large reserve base waiting for future development and  
14   production.

15           For most of its history the U.S. has depended on  
16   coal. At one point every major economic sector used coal:  
17   Transportation. Ships and trains were coal-fired. The  
18   residential and commercial sectors used coal for cooking and  
19   heating. Coal fired most of the industrial processes. Coal  
20   was used to manufacture gas, and coal was used as a  
21   feedstock in most chemical processes. And, of course,  
22   electrical power was produced from coal.

23           Over the years coal has been displaced in some  
24   markets. For example, transportation.  
25   Residential/commercial use has declined. In industrial



1 applications coal use has also dwindled from its historic  
2 highs where once coal accounted for perhaps 75 percent of  
3 the nation's energy.

4 Today coal accounts for only 26 percent. Now, oil  
5 and natural gas account for 74 percent, but look at the  
6 reserve base. What is the future availability of fuels that  
7 will be necessary to insure our economic growth. Ninety-  
8 four percent of that energy reserve base is coal. Only six  
9 percent is oil and gas.

10 In 1988 this country will consume 869 million tons  
11 of coal, and export another 89 million tons. Nine hundred  
12 fifty-eight million tons. Three hundred sixty-one million  
13 tons, or 38 percent, is produced west of the Mississippi,  
14 and 157 million right here in Wyoming.

15 Eighty percent of domestic coal consumption is  
16 used to generate electric power, and 57 percent of all  
17 electricity generated in this country is coal-based. The  
18 remaining 20 percent of domestic coal is a split between  
19 industrial applications and metallurgical coal for the  
20 nation's steel industry.

21 Coal utilization had increased, up to 200 million  
22 tons in the past ten years. At the same time we have  
23 reduced emissions. Total SO2 emissions have declined by  
24 nine million tons since their peak in 1973.

25 Environmental responsibility has been an integral



1 part of increased coal utilization. As we look to the  
2 future, coal use will increase, reaching in excess of one  
3 billion tons before the turn of the century. However, coal  
4 use cannot expand unless environmental issues associated  
5 with coal combustion are addressed.

6 The Western coal market was developed, in part,  
7 because of the national commitment to reduce emissions of  
8 SO2. The West will continue to have a major part to play in  
9 both the energy security of this country and the work to  
10 insure a cleaner environment. Research and development, new  
11 innovative means to use new coal in a clean, safe,  
12 environmentally acceptable manner, is a national priority.

13 We in the West want to expand Western coal's role  
14 and find ways to use more coal. Just as Amax Coal took a  
15 chance in the early 1970s and did some experimenting, so too  
16 others must take the opportunity to reach out.

17 Once again Amax is taking a leading role at our  
18 Bel Ayr Mine. Amax Coal is putting the finishing touches on  
19 the first of its kind fluidized bed coal drier. This drying  
20 will upgrade the subbituminous coal from 8,400 BTUs to a  
21 product with 10,900 BTUs. This greatly expands the market  
22 potential of the Powder River Basin' inherently low-cost,  
23 low-sulfur coal.

24 More can and must be done in the West, and we need  
25 the support of the Clean Coal Technology Program. We in the



1 coal industry know that there is strong support, and a  
2 commitment to coal use on the part of the Department of  
3 Energy and the Office of Fossil Energy. DOE has been  
4 working hard to support coal and coal-based programs.

5 The Morgantown Energy Technology Center and the  
6 Pittsburgh Energy Technology Center are well known for the  
7 research they've conducted. Clean Coal I and Clean Coal II  
8 offer financial support for new clean coal technology, for  
9 work in coal preparation, conversion, combustion, and energy  
10 conversion processes, coal products, flue gas  
11 desulfurization, cleanup, and a host of other efforts.

12 The question before us here today, however, is not  
13 the degree of the DOE support for coal, but a simple  
14 question: Why, after two rounds of solicitation, have so  
15 few Western projects been proposed and selected?

16 To get a handle on that question, I'd like to  
17 briefly review two items. The first is the Annual Report to  
18 Congress, which outlines objectives of the Clean Coal  
19 Technology Program. Second, I'd like to review the criteria  
20 under which Clean Coal Technology projects are evaluated.

21 Perhaps in reviewing these two items some  
22 considerations may surface and may help us to at least  
23 understand the apparent lack of Western coal-based projects.  
24 With that understanding perhaps the Clean Coal III  
25 solicitation can be focused so as to encourage demonstration



1 of a diversity of technologies utilizing both high- and low-  
2 sulfur coals, "with no prejudice towards any geographic  
3 region," to paraphrase a Congressional intent over the last  
4 four years.

5 According to the Annual Report to Congress,  
6 December 1987, the role of the Clean Coal Program is four-  
7 fold:

8 Number 1, to serve as a cornerstone of the U.S.  
9 acid rain strategy;

10 Second, to serve as an effective strategy for  
11 achieving the long-range goals in power production;

12 Third, to be a passport to energy security;

13 And finally, to enhance the competitive edge of  
14 the U.S. in the international marketplace.

15 The issue of acid rain seems rather  
16 straightforward, and clean coal technology projects, both  
17 proposed and selected, address the need to reduce the  
18 emissions of SO<sub>2</sub> and NO<sub>x</sub>. However, perhaps we need to  
19 broaden the issue: not just acid rain, but include also our  
20 concern for the newly emerging concerns for global warming.  
21 This would add carbon dioxide to the list of pollutants to  
22 be addressed, and might expand the types of projects  
23 responding to Clean Coal III.

24 The second point, to be an effective strategy for  
25 long-range goals in our power production, this clearly



1 points to a need to consider the future electrical power-  
2 generating resources of this country, and to support the  
3 development of not only clean but also economical units,  
4 units capable of rapid construction with a high degree of  
5 performance efficiency over a wide range of sizes.

6           There's also a need to demonstrate environmental  
7 control options less sensitive to coal type; and for a wide  
8 range of boiler sizes and types. Present day technologies  
9 cannot meet these objectives in many situations. In fact,  
10 commercial conventional technologies, for both power  
11 production and pollution control, are nearing the end of  
12 their development potential.

13           In addition, development of processes which  
14 upgrade coal into commercial products will broaden its  
15 acceptability in both the utilities and industrial markets.  
16 Therefore, the next five to ten years will be critical in  
17 developing new energy options which will help meet America's  
18 energy objectives, both economic and environmental.

19           One of the successful outcomes of the Clean Coal  
20 Program should be a new collection of clean coal  
21 technologies that are not only environmentally improved, but  
22 also more efficient. Highly efficient, environmentally  
23 responsive coal-based power plants which can be easily and  
24 quickly fabricated in wide ranges of modular sizes. More  
25 emphasis on efficiency, would in my opinion help push



1 Western-based projects. New technologies to meet the  
2 growing energy demands in the West, and to demonstrate the  
3 technologies that will be needed eventually in the East as  
4 older units, 30 and 40 years old, will be replaced.

5 The third element is really a part of the second,  
6 to be a passport to energy security, means efficiency, and  
7 it means coal. I've already touched on the importance of  
8 coal, the vastness of U.S. energy resources contained in the  
9 coal resource base. The Clean Coal Program should be used to  
10 promote energy security, efficiency, as well as to reduce  
11 emissions.

12 The Clean Coal Program is to help provide a  
13 competitive edge in an international marketplace. New  
14 technologies that enhance the export of U.S. coals is one of  
15 the goals. Projects that serve as a showcase for new clean  
16 coal technology concepts, new combustors, new scrubbers, new  
17 coal cleaning devices, and new power-generating options all  
18 using U.S. coals. Focus here must be for new projects.

19 There's another aspect not touched on in DOE's  
20 Annual Report to Congress. The international marketplace as  
21 it relates to the nations's competitive position, and the  
22 use of low-cost, environmentally-sound electrical power.  
23 Electrical power is, after all, one of the most driving  
24 forces behind economic success, success here and throughout  
25 the world. Strict environmental controls have added to the



1 cost of the U.S. products, and in some way hindered our  
2 ability to compete in some markets. Clearly the intent of  
3 the Clean Coal Program is to reduce pollution, but it is  
4 also to sustain this country's economy in 1990 and beyond.

5 Now I'd like to turn briefly to the evaluation of  
6 Clean Coal II criteria. The program policy factors which  
7 were used to critique and select the various projects that  
8 were submitted. After reviewing the basic qualifications  
9 and preliminary evaluation components that would tend to  
10 favor or disfavor, encourage or discourage Western-based  
11 products.

12 Next comes the comprehensive evaluation. The  
13 comprehensive evaluation is made up of a number of parts:  
14 The technical proposal, the business and management  
15 proposal, and the cost proposal. The technical proposal is  
16 a weighted evaluation of selected criteria. There are two  
17 main considerations, commercialization factors and  
18 demonstration project consideration.

19 Commercialization consists of two basic  
20 parameters. The extent to which a proposed technology, when  
21 used at existing coal-fired facilities, can reduce total  
22 national emissions of SO<sub>2</sub> or NO<sub>x</sub>, and the extent to which  
23 the proposed technologies can reduce transboundaries or  
24 interstate air pollution. No credit is given for reduction  
25 of emissions and applications where current commercial



1 technologies can be used. Credit shall be given for  
2 technologies that make beneficial use of solid waste that  
3 may be generated.

4 The second use is cost effectiveness. Here the  
5 extent to which a proposed technology which was used at  
6 existing coal processing facilities, that is a cost per ton  
7 of pollutants removed, controlling emissions of SO<sub>2</sub> and NO<sub>x</sub>,  
8 when compared to currently available control technology  
9 options to accomplish comparable emissions reductions. The  
10 extent to which the technologies affect the cost of  
11 producing electrical power will be considered.

12 Perhaps here, within these two commercialization  
13 factors, there may be an interpretation that could tend to  
14 reduce a role of Western-based projects. For example, the  
15 emphasis on existing coal-fired facilities. In the West,  
16 most coal-fired utilities already are using either low-  
17 sulfur coal, or have the latest emission control  
18 technologies commercially available. There is perhaps less  
19 incentive to seek out additional reductions.

20 Also, if one looks at the number of facilities and  
21 their age, power plants and industrial boilers tend to be  
22 larger and newer, again limiting the potential for both cost  
23 efficiency and effective additional reductions.

24 Quite frankly, the available pool of potential  
25 sites in which to conduct the demonstration projects is much



1 more limited in the West than in the East. The cost  
2 effectiveness issue, targeted as it is on SO<sub>2</sub> and NO<sub>x</sub>  
3 control, also would tend to diminish the number of suitable  
4 Western projects. Perhaps by emphasizing the efficiency  
5 aspect of power production of new projects, not just  
6 existing facilities, will more Western projects be  
7 developed.

8           The demonstration project factors include four  
9 areas that should be satisfied. One of these criteria is of  
10 concern. Let me explain that one. Environmental, health  
11 and safety, socio-economic, and other site-related aspects  
12 must be appropriate. The adequacy and appropriateness of  
13 the proposal, the suitability, quality, and adequacy of the  
14 site, the degree to which current emissions of SO<sub>2</sub> and NO<sub>x</sub>  
15 are reduced, especially emissions which contribute to  
16 transboundary pollution.

17           In general, there is nothing contained in this  
18 criteria that would inherently discriminate against or lead  
19 to fewer number of Western projects. However, the emphasis  
20 on retrofitting existing facilities and on control of  
21 current SO<sub>2</sub> and NO<sub>x</sub> emission likely reduces the number of  
22 Western projects that might otherwise be proposed.  
23 Therefore, perhaps a restating of intention of this criteria  
24 could help encourage additional Western products.

25           After all the reviews, program policy factors were



1 applied to make the final selection, these factors are not  
2 used to indicate an individual project's merit, but to  
3 choose those projects that best achieve the program  
4 objectives. Again, there are three items to be considered.

5 One, the desirability of selected programs for  
6 retrofitting and/or repowering existing coal-fired  
7 facilities.

8 Two, the near-term reduction of transboundary  
9 transmissions of SO<sub>2</sub> and NO<sub>x</sub>.

10 Three, the collective ability of the projects to  
11 demonstrate economic reductions to a combination of existing  
12 facilities, and contribute to transboundary reductions in  
13 SO<sub>2</sub> and NO<sub>x</sub>.

14 Once again, these criteria would, I submit, tend  
15 to favor Eastern based projects. I think the point is  
16 supported by looking at projects selected in Clean Coal I  
17 and Clean Coal II. While there's plenty of them, I don't  
18 think there's time to go through all of them, but there's a  
19 number of interesting observations one can make.

20 First of all, there's a wide variety of  
21 technologies being demonstrated. Pressurized fluidized bed,  
22 limestone injection system, cyclone systems, coal  
23 gastification technologies, and industrial technologies,  
24 most aimed at SO<sub>2</sub> or NO<sub>x</sub> cleanup.

25 In looking at the coal types being addressed, the



1 vast majorities tend to be high-sulfur, Eastern coals, which  
2 is fitting, given the thrust of the project directed towards  
3 acid rain. In terms of the project, itself, a large number  
4 is targeted to retrofitting existing small, 70 to 200  
5 megawatt utility boilers or industrial boiler systems;  
6 again, the focus on reductions in SO<sub>2</sub> and NO<sub>x</sub> through the  
7 application of these technologies.

8 The last point I'd like to make is that the  
9 projects typically involve a team approach with either an  
10 A&E firm, a utility, and an equipment manufacturer joining  
11 forces to demonstrate a technology. When one considers the  
12 potential for additional retrofit business if a technology  
13 works, the emphasis on Eastern based projects is perhaps  
14 even more likely.

15 In summing up, I think the Clean Coal Technology  
16 Program has nothing inherently inconsistent with the  
17 Western-based projects. However, there would appear to be a  
18 strong emphasis on retrofit and repowering technologies,  
19 which lend themselves to demonstration on existing older,  
20 smaller power units, and there are, or tend to be, more of  
21 these located in the East.

22 The emphasis on reducing SO<sub>2</sub> emissions in the West  
23 is modest in comparison to the East. In order perhaps to  
24 stimulate additional Western projects there is a need to  
25 communicate to potential project developers that



1 demonstration projects need not be confined to retrofit or  
2 repowering of existing units. The capability of retrofit or  
3 repowering is what's significant. Old or new should not  
4 matter in terms of demonstration.

5 Clean Coal III should consider giving additional  
6 weight to projects which further the Clean Coal Technology  
7 Program objectives of efficiency, lower cost, future power  
8 needs, and export potential. This may help stimulate  
9 interest in the Western-based programs.

10 Before closing I'd like to encourage those of you  
11 who might be thinking about Western projects. Amax Coal  
12 Industries is considering developing a proposal for Clean  
13 Coal III. We think we have a good shot at success, and  
14 meetings like this encourage us. The opportunity is there  
15 to develop a project with good people, and I'm sure you'll  
16 see more Western-based projects.

17 And, we would like to thank the Department of  
18 Energy, the Fossil Fuel people, Mr. Wampler and Mr. Siegel  
19 for their interest in the West and Western projects, and for  
20 giving us the opportunity to discuss our concerns. I do  
21 believe that they are committed to coal, and to enhance the  
22 use of coal, and together perhaps we can find some common  
23 ground upon which to push forward, and a successful new  
24 round of projects under Clean Coal III, and I thank you.

25 MR.SIEGEL: Thank you very much, Gary.



1 Well, this morning, then, you've heard from  
2 Secretary Wampler about the national perspective, and the  
3 importance of this program, and what brought us here today,  
4 from me an update of the program, from our State  
5 Representative, a State's perspective of the issue, and from  
6 our industrial participants, a Western industrial view of  
7 the issue, as well.

8 Now, is time, for the real fun part of the  
9 meeting, where all of you have an opportunity to, proceed  
10 from here on out. We plan to break for about 15 minutes  
11 while some of the rooms are set up, and reconvene into four  
12 working rooms.

13 We'll be using the Regency Room located across  
14 from the registration area, the Rouge Room, which is located  
15 across from the registration area also, the Southwest  
16 American Room, and the Northwest American Room. We have  
17 enough people to break up into groups of 30 people each,  
18 which will really, I think should provoke some very good  
19 discussion.

20 I'd like to introduce the Department of Energy  
21 moderators, and the scribes that are with us today who will  
22 be helping to lead the discussion. It's the purpose of the  
23 moderators to insure that we do have good discussions within  
24 the groups, but really, the focus of what's going to be  
25 discussed is up to you.



1           Let me introduce the moderators along with the  
2 scribe that goes with them. Dave Jewett, from the Department  
3 of Energy, and Gerald Groenewold.

4           Steve Oldoerp and Michael Jones, in the back of  
5 the room.

6           Gary Voelker and Dawn Kladianos.

7           And, George Weth and John Ballenot.

8           Because of the size of the group and the smallness  
9 of the eating facilities here, it has been suggested, that  
10 we break and recess for lunch at 12:00 on the button.  
11 Following lunch, and, we expect it's going to take one and  
12 a-half hours for lunch because of the size of the group,  
13 we'll reconvene back into the working sessions again.

14           Later this afternoon there will be another break  
15 where the moderators and their scribes can get together and  
16 prepare their notes, and then a plenary session later this  
17 afternoon where the moderators will report on what they  
18 heard in their sessions, and there will be an opportunity  
19 for all of you to correct the Record, if that is necessary.

20           I think I mentioned that the plenary session this  
21 morning and the plenary session this afternoon, are being  
22 transcribed, and the reports of this meeting will be made  
23 available to all of you upon request. We are not  
24 transcribing the breakout sessions. We think that that will  
25 offer the opportunity for a freer and more open discussion,



1 if we aren't taking down every word you say, and you or your  
2 company, are not cited for any statements that you make.

3 We're really here to hear your views, and your  
4 views will be represented in the summaries that take place,  
5 so with that, again, I very much appreciate your attendance,  
6 and after a 15-minute break we'll reconvene into the working  
7 groups.

8 There are three exits, because of the size of the  
9 group, on both sides and the back.

10 (Whereupon, at 10:55 a.m. the meeting formed  
11 breakout groups, off the Record, after which, at 4:09 p.m.,  
12 the following occurred:)

13 MR. SIEGEL: Okay, we, are we ready to start the  
14 wrap-up session?

15 Denise, does it look like most everyone is in?

16 Okay. Before we start with the wrap-up I just  
17 wanted to mention one other thing that became apparent as I  
18 was sitting in the various breakout groups that we had.  
19 Many of you pointed out in your discussions that you have  
20 processes that may not be mature enough for the kind of  
21 demonstration program that we've been discussing here. I  
22 just want to make sure that you all know that besides  
23 looking at what we can do to improve the possibilities of  
24 getting more Western involvement in the Clean Coal  
25 Demonstration Program, we also are trying to do the same



1        thing in our research and development program.

2                So, to the extent you've got ideas that you don't  
3        think are quite mature enough for the demonstration program,  
4        our doors in Morgantown and Pittsburgh are open to any  
5        suggestion you may have, any discussions you may want to  
6        start with us on the research and development side, as well.

7                With that, then, let me introduce Lowell Miller.  
8        Dr. Miller is the Associate Deputy Assistant Secretary in  
9        charge of the Clean Coal Technology Demonstration Program  
10       who will wrap up today's program.

11               MR. MILLER: Thank you, Jack.

12               I've had the opportunity to walk around and watch  
13       the various groups function, and I'm very impressed. I  
14       think that I can represent them as a very candid exchange,  
15       and I'm sure that we've gained immeasurably by the  
16       discussions that have gone on. I hope that you've  
17       understood a little bit more about the rules and  
18       regulations, and some of the limitations we have in  
19       implementing the program.

20               At this point there are too many people to thank  
21       for making this meeting such a success. Needless to say,  
22       the attendance was far more than we had expected, and the  
23       participation was terrific. So rather than spend time  
24       thanking all those that deserve recognition I think we'll  
25       proceed and move on into the moderator's discussion.



1           Before I do that, however, there has been one  
2       question that I want to answer, because I know of the high  
3       interest in it, and that is the question about the  
4       proceedings. We have had the plenary sessions recorded.  
5       However, the discussions that have gone on in the various  
6       working groups, and the presentations need to be collected  
7       and finalized.

8           It is our intent, and I hate to put myself on a  
9       schedule, but within the next four weeks to six weeks, to  
10      actually wrap all of that material into a report which will  
11      cover this particular meeting, and it will include the text  
12      of the presentations, maybe not the full text of the  
13      recorded transcripts, depending upon how relevant it is, the  
14      report of the moderators and the attendance list.

15          If you have not signed any one of the lists for  
16      receipt of that material, be sure you get on one. There's  
17      still a list out on the front desk. There was a list  
18      circulated in each one of the rooms. If you are on any one  
19      of those lists you don't have to worry about signing up  
20      again, but make sure that you are down at least once.

21          With that I would like to call up the first  
22      moderator for the first section, and that is George Weth,  
23      who will make a presentation of the highlights of what he  
24      thought was covered in his particular group.

25          MR. WETH: Well, we spent a good portion of time



1 just reviewing the philosophy of Clean Coal I and Clean Coal  
2 II, trying to thoroughly understand the criteria. The  
3 outcome of that was a few points that we thought were worthy  
4 of presenting here.

5 The group felt that the Western coal projects are  
6 not compatible with the PON language, the specific language  
7 being the repowering, retrofitting of existing facilities.  
8 Most Western coal projects are centered around coal  
9 beneficiation and fuel upgrading to increase fuel value and  
10 reduce transportation costs. We felt that the use of the  
11 Clean Coal Technology I criteria would be the right approach  
12 to open up projects for the Western coals. The language of  
13 Clean Coal II was much too limiting.

14 Western coals, the Western coal marketing concerns  
15 and the Lewis-Davis criteria, according to the group, seemed  
16 to be diametrically opposed. Refueling and fuel switching  
17 was the only way that the Western coal projects could be  
18 applicable to Clean Coal II and Clean Coal III as presently  
19 structured, but they are not allowable under the present  
20 criteria.

21 It was also felt that the evaluation criteria as  
22 written are very confusing to those not used to dealing with  
23 DOE, and would DOE please try to make a succinct effort to  
24 eliminate the ambiguities that are in the PON.

25 This then led into a lengthy discussion about



1 using a two-phase approach and trying to cut down the costs  
2 for the participants, and we proposed coming up with and  
3 initial selection of qualified candidates short list. This  
4 would reduce the costs of putting together a proposal for  
5 those who do not make a short list. It would then  
6 appropriately increase the overall costs of those people  
7 making short lists and going into full-scale evaluation.

8           However, it was concluded that if DOE, again,  
9 could make the PON much clearer in identifying what they  
10 really want, and make it unmistakable as to who should try  
11 to respond, i.e., eliminate legalese and the subjective  
12 nature of the language, then there would be no need to go  
13 into a two-phase approach and we would be able to maintain  
14 the 120-day schedule without any problem.

15           It was also felt that we should open up the PON to  
16 more innovative clean coal technology which would have a  
17 higher risk but a higher payoff for the economics and the  
18 environmental concerns. That is, California and  
19 Massachusetts, for instance, would prefer more innovative  
20 technologies that would approach giving single-digit type of  
21 SO2 and NOx emissions.

22           Also, the type of future projects they thought  
23 that we should try to give credit for was discussed. The  
24 biggest problem in the West, of course, is not the SO2, but  
25 they do have a rather large NOx problem, and they would like



1 to attack that. The question was asked is there some way we  
2 could give credit for just NOx reduction and allow that as a  
3 Western-type project?

4 Also, it was stated that the DOE should try t  
5 accommodate projects that would deal with Western coals,  
6 low-sulfur coals, by getting rid of a large percent of the  
7 SO2 emissions from low-sulfur coals, therefore opening it up  
8 to a California situation, and more applicable to the  
9 Western areas. This, of course, would not be economical for  
10 an Eastern coal, but why not give credit to, to the Western  
11 coals for being able to accomplish that?

12 It was also felt that we should give credit for  
13 Western coal projects that would open up new markets, The  
14 present structure does not allow that, but if we could open  
15 it up to the Pacific States and the Pacific Rim areas, this  
16 would be quite helpful.

17 Recognizing that in taking these high risk  
18 projects we are getting into the R&D area. However, if the  
19 CCT program could not accommodate the very high risk-type  
20 projects, DOE should make sure that it continually reviews  
21 the R&D program to have those type of projects in the  
22 pipeline for future solicitations.

23 Those seem to be the major things that we were  
24 looking at in our group, and I'd like to thank John Ballenot  
25 for assisting me. If it wasn't for him I wouldn't have had



1 even this much as far as my notes are concerned, and I would  
2 like to thank the group. They were extremely helpful and  
3 very open, and we probably could have gone on for another  
4 hour or so, so thank you all very much.

5 MR. MILLER: To present the results of the second  
6 discussion group, we'll have Mr. Steve Oldoerp cover what  
7 they had to say in his group.

8 MR. OLDOERP: Lowell, thanks very much. Before I  
9 begin, I'd like to thank Mike Jones of EMRC for assisting me  
10 this afternoon. I would also like to thank all of our  
11 participants for their insights and comments. Sounds like  
12 our group talked about most of the same things that  
13 Georges's group talked about.

14 As points of the discussion evolved, we grouped  
15 them around basically five major points. The first point  
16 was the statement made that the cost of SO2 removal in  
17 dollars per ton for Western coals will be higher, since  
18 lower sulfur levels are present in the Western coals.

19 The solution that was suggested to this issue is  
20 that there should be some sort of an efficiency criteria  
21 that measures the dollars to achieve a specific sulfur level  
22 per million BTU's. The results of this solution would be to  
23 help achieve a more level playing field between Eastern and  
24 Western projects.

25 Like George's group, our group felt the



1 transboundary emissions were not particularly salient to  
2 Western coal development.

3 The second large point that we discussed, that was  
4 there was too much of an emphasis on utility-based projects?  
5 One solution would be to broaden the criteria to permit the  
6 full utilization of the entire coal resource base. This  
7 would also include projects that featured liquids and  
8 chemicals. In essence, anything that was not a utility-  
9 based project would be an improvement from the perspective  
10 of Western proposers.

11 The third major point is sort of an overall,  
12 sweeping critique of DOE's Clean Coal Program, not just the  
13 PON. The statement was made that the PON was designed to  
14 protect the status quo, meaning East versus West, and to  
15 retard Western coal development. The root of the problem,  
16 according to the group, is that little R&D money has been  
17 shoveled into Western coal projects over a period of time.  
18 As a result, the same number of Western projects are not at  
19 the commercial stage as some of the Eastern sited projects  
20 would be.

21 There was a suggestion that there was a need for a  
22 program, at least in the context of the PON, that featured  
23 funding of pilot plants as well as commercial scale  
24 facilities. There was a lot of discussion as to some of the  
25 problems in doing that, but nevertheless it was a solution



1 that a number of people were interested in.

2 Also along those lines, it was recommended that  
3 the PON needed to specifically recognize precombustion  
4 technologies in one of two fashions: either to specifically  
5 recognize include precombustion technologies under the  
6 definition of "retrofitting power," or to some other way  
7 explicitly recognize the legitimacy of precombustion  
8 technologies in the Clean Coal Program.

9 The fourth major discussion area was that projects  
10 should not focus merely on applicable technologies, in other  
11 words, that the hardware that's developed in a project ought  
12 to be able to use a variety of coal types, not just one coal  
13 type specific to a site. In essence we needed to focus on  
14 hardware that was a little more universal than is currently  
15 the case.

16 The fifth and final point that we discussed in  
17 detail deals directly with the PON itself. There was a lot  
18 of sentiment that the PONs, both for Clean Coal I and for  
19 Clean Coal II, were extremely confusing in their  
20 instructions. It was observed that we needed to do a better  
21 job in defining financial terms and environmental terms in  
22 particular, and to either provide in the texts definitions  
23 or a glossary of definitions in some fashion. A second  
24 suggestion was much like George's suggestion, was that we  
25 look into a two-stage proposal process whereby a white



1 paper, which was the term that we used, would be submitted  
2 by proposers, and the DOE would select a short list of  
3 candidates from those relatively small proposals and then  
4 work from that stage before entering into negotiations.

5 The group felt that one major advantage of using a  
6 two stage process would be that we would be able to talk in  
7 an interim fashion, the proposers and DOE, which would  
8 provide for much more clear understanding as to what our  
9 program was about, as well as what these projects were about  
10 on an actual basis.

11 It would also help reduce proposal preparation  
12 costs to a large extent. Since proposers would only be  
13 asked to provide that information in a staged fashion, they  
14 would need to provide a summary amount of information  
15 initially, and then provide more detail as the project,  
16 itself, matured.

17 In essence, those are the five points that the  
18 group as a whole thought were the most important ones to be  
19 discussed. Thank you.

20 MR. MILLER: Thank you, Steve.

21 MR. WAMPLER: Let me interrupt a minute, I've got  
22 to leave for a few minutes to see Governor Sullivan, but I  
23 did not want to miss an opportunity to say a few words to  
24 this group.

25 I think I'm already hearing a sense of some



1 unanimity around the room from the two reports I've heard,  
2 and I'm sure I'll get more of it as we go forward with some  
3 other new ideas. I think the question in your minds, and if  
4 it's not in your minds, it should be in your minds, is:  
5 Where do we go from here?

6 We had a task force put into place after we  
7 perceived the problem in Round Number 2 that was somewhat in  
8 advance of this meeting with some pretty high-level folks in  
9 DOE on it and it was to look at two things.

10 One was to make sure we had a comprehensive plan  
11 in place. There's no doubt that we've neglected low-rank  
12 coal R&D for a number of years. I've said this at least  
13 once in Congressional testimony, that we have neglected it,  
14 and we're going to fix that.

15 The second thing, our second task force has been  
16 looking at is Clean Coal Number 3, and the changes we need  
17 to make in the PON. Western participation is a major focal  
18 point of that task force, We're going to look at our policy  
19 criteria which we have total control over to make sure that  
20 the playing field is level for Western participation. I  
21 have some doubt that it was in the past. We thought it was  
22 when we put the PON out, but in retrospect I have some doubt  
23 that it was.

24 The second thing we're going to do very  
25 aggressively, and I'm talking about waiting ten months to do



1       this, is that in the next few weeks we're going to start  
2       working with the Congressional delegations, once we digest  
3       all of this information to see if we need a legislative fix,  
4       and make an attempt to get all the parties to agree. That's  
5       sometimes like a three-ring circus in Washington, but I  
6       think we'll do whatever we need to get a legislative fix to  
7       get a good criteria to ensure Western participation.

8               I'm very sorry for interrupting this meeting, but  
9       I don't think I've been around or I don't think in my  
10      experience with the Department that I've seen a more candid  
11      group of people. I've been trying to meet as many people as  
12      possible on a private level. I think it's had a great deal  
13      of impact on us, and I think it will continue to have a  
14      great deal of impact on us.

15             I just want to say I really appreciate your taking  
16      a day, and some of you took two days in view of your travel  
17      to spend this time with us and try to help us through this,  
18      through this third solicitation that we're going to be going  
19      through, and I can guarantee you you're going to be listened  
20      to. What you have said here today has not fallen on deaf  
21      ears, and we'll do everything we can to make this playing  
22      field level, whether it be a legislative fix or a policy  
23      fix, and I just want to thank you personally for being here  
24      today.

25             Thank you very much.



1           MR. MILLER: Now Gary. I've given you the tough  
2 act to follow.

3           MR. VOELKER: Yes, and my boss doesn't even get to  
4 hear what I have to say.

5           Yesterday afternoon I found out that my co-  
6 moderator and scribe was going to be Dawn Kladianos from the  
7 Western Research Institute at Laramie. as you probably  
8 would do, I, wrote down D-o-n for "Don." As it very  
9 pleasantly turned out, "Dawn" is spelled D-a-w-n, and I'd  
10 like to take this opportunity to thank her for her excellent  
11 support during the two working sessions.

12           We had an incredible cross-section in our group.  
13 It resulted in an exciting, fast-paced productive dialogue,  
14 and I think you're going to agree with me that we have some  
15 excellent recommendations. We had representatives of U.S.  
16 railroads, State Government, the Electric Power Research  
17 Institute, coal producers (several of those), architectural  
18 engineering firms, electric utility, power companies,  
19 national laboratories, and three organizations who in turn  
20 represent a very broad-based spectrum of membership, more  
21 specifically the Western Energy Board, National Coal  
22 Association, and the Clean Coal Coalition.

23           We approached the discussion in two phases. The  
24 first phase was to try to identify those reasons that led to  
25 so few proposals in Clean Coal I and Clean Coal II. Second,



1 we then tried to attack the problem: that being the case,  
2 what can we do in Clean Coal III to remedy this situation?

3 So, first for those reasons for a few proposals in  
4 Clean Coal I and Clean Coal II. In the case of Clean Coal  
5 I, it was a short response time. Few Western coal interests  
6 felt that they adequately had time or they did not have  
7 processes developed to the point that they could really  
8 respond to the Program Opportunity Notice.

9 The Western sites tend to be newer. Western sites  
10 tend to be using newer processes, newer technologies. Those  
11 new facilities, because they are newer, in most cases  
12 already meet new-source performance standards, therefore  
13 detracting from their attractiveness as an actual  
14 demonstration site. The expanded utilization of Western  
15 coals is a fairly recent occurrence. Within the last ten to  
16 15 years we've seen a dramatic growth.

17 We heard this morning that in 1973 we were talking  
18 about 10 million tons and now we're talking 140, 150 million  
19 tons from the same region. This very dramatic increase that  
20 reflects back on the fact that the processes and  
21 technologies are also new, so they're trying to catch up.

22 With reference to Clean Coal I, one point that was  
23 made several times was that Clean Coal I, as perceived by  
24 the Western coal interests, was really an Eastern high-  
25 sulfur coal program. Whether that perception was real or



1 not, or whether it was based in fact really wasn't all that  
2 important. It was the perception that was borne out, and  
3 therefore also contributed to the fact that we had a very  
4 small number of proposals in Clean Coal I.

5 In Clean Coal II it was felt that the criteria  
6 were significantly more restrictive with regard to Western  
7 clean coal interests than Clean Coal I, and as a result of  
8 those more restrictive criteria it led to fewer proposals in  
9 Clean Coal II.

10 We then removed on to address the question that,  
11 that being the case, what can we do in Clean Coal III to  
12 overcome some of the obstacles to Western coal interests.  
13 We wrestled with this for quite some time.

14 It was at this point that we took off our coats,  
15 rolled up our sleeves and opened the door in the back. Some  
16 people tried to sneak out but we wouldn't let them. We  
17 decided that the starting point should be an objective  
18 statement, and the objective statement that we unanimously  
19 settled on was the following: The purpose of Clean Coal III  
20 should be to demonstrate advanced technologies to expand the  
21 utilization of all U.S. coals with improved economics,  
22 efficiency, and environmental performance.

23 We then went on to discuss the actual criteria  
24 themselves that we believe should be applied to give us that  
25 even playing field.



1           First, the demonstration criteria themselves, the  
2 criteria that apply specifically to the demonstration  
3 project itself. Number one, technical readiness. It was  
4 felt that the technical readiness obviously is a criteria  
5 that has to be applied to any project. However, because of  
6 the comments I made earlier about Western technology being  
7 newer and because that there are not as many R&D facilities  
8 available in the West on new processes, the evaluation  
9 criteria, when applied, should allow for higher risk  
10 projects. We had a significant amount of discussion about  
11 that. It was readily recognized that expanding the criteria  
12 or allowing the criteria to favor projects of higher risk  
13 would not in itself lead to more proposals from the West.  
14 However, it could lead to more awards of those that will  
15 propose.

16           Let us now move on to the environmental criteria  
17 that relate specifically to the demonstration projects. The  
18 criteria that requires the proposer to submit a plan showing  
19 how he's going to comply with environmental regulations,  
20 whether they be State, local, or Federal, is something we  
21 can leave alone as it is. It doesn't really need any  
22 changes, but absolutely is something that should be  
23 included.

24           As I've said, we already had our sleeves rolled  
25 up, so this one came across strongly. The group agreed that



1 the criteria which measures the degree to which the specific  
2 demonstration project reduces emissions should be deleted,  
3 it should not be included. It was not included in Clean  
4 Coal I, and it was felt that it was a very difficult  
5 criteria to measure fairly, whether it be Eastern or  
6 Western, precombustion, or post-combustion. It simply  
7 should be deleted, as it was in Clean Coal I.

8 We then moved along to the criteria related to the  
9 commercialization that would result from the following  
10 efforts on the technology that was being demonstrated. This  
11 is probably the most important concern that was expressed by  
12 the group. The concern was this: the amount of SOx and NOx  
13 emissions, and transboundary reductions, and the cost  
14 effectiveness of controlling Sox and Nox, that was stated in  
15 Clean Coal II as Lewis-Davis criteria, okay.

16 Now, if you recall from the previous two  
17 presentations, we had a significant disagreement here. Our  
18 group felt that those criteria were all right. However,  
19 there was a significant problem in the way that the criteria  
20 were applied; by forcing technologies to use an Eastern, in  
21 this particular case a Freeport Coal placed precombustion  
22 technologies and low-sulfur Western coals at a very  
23 significant and unfair disadvantage. The Department of  
24 Energy should very closely look, revisit that criteria as  
25 well as the implementation. Also the Program Opportunity



1 Notice should include some description of the model that's  
2 going to be used, and the way that this particular criteria  
3 is going to be applied.

4 Lastly, under the commercialized technology, it  
5 was felt that a criteria should be included which would  
6 measure the extent to which the technology would result in  
7 the expanded utilization of U.S. coals. That was the  
8 criteria that was included in Clean Coal I.

9 I was asked by the group to again ask the  
10 Department of Energy, as it's going through the process of  
11 developing the criteria for Clean Coal III, that the Program  
12 Opportunity Notice itself be revisited and pay close  
13 attention to the objective statement, that is -- To  
14 demonstrate advanced technologies to expand the utilization  
15 of all U.S. coals with improved emission, efficiency, and  
16 environmental performance. They felt that if that were done  
17 they would truly have a level playing field to play to on.

18 With that, I want to thank you, the participants  
19 in our group. It was very productive, and I thank you very  
20 much. (4:37 p.m.)

21 MR. MILLER: Thanks, Gary.

22 The fourth and last report, Dave Jewett.

23 MR. JEWETT: One of the troubles with being last,  
24 of course, is everybody already has stolen all of your  
25 thunder, so let me just give you a couple of bottom lines.



1           First, I'd like to make an observation about our  
2 group. Five utilities were represented, including two  
3 cooperatives. We also had representatives from energy  
4 companies, two States, (South Dakota and Wyoming), one  
5 University, one environmental group, three from the Federal  
6 Government, not counting us, four coal mining companies, and  
7 one consultant. In all that group, we had about six with  
8 any previous experience working with the Federal Government  
9 in a procurement kind of mode. Everybody else was suffering  
10 from some serious culture shock, so we talked a lot about  
11 how Government does business.

12           Let me just give you problems and proposed  
13 solutions, bottom lines. As you've heard from the other  
14 groups, and we agree, Western technology is less mature.  
15 That says something about the evaluation factors in terms of  
16 readiness of projects that would be proposed under the Clean  
17 Coal Program.

18           It raises questions about whether it may be  
19 feasible to have pilot plants operating and expecting data  
20 somewhere downstream during the design phase of a project,  
21 which would be used in a Clean Coal Project.

22           More flexibility. There's a lack of Western sites  
23 for an electrically oriented kind of strategy, and that,  
24 along with growth rates, doesn't make that very attractive  
25 as an option for clean coal projects in the West.



1           There's a perception, and probably an accurate  
2           one, that the Western States are not in a position to help  
3           in financing clean coal projects the way some of the Eastern  
4           States are. Cost of proposals are too high. That's a  
5           problem for everybody who proposes. It's especially a  
6           problem for small proposers, and for some of the kinds of  
7           projects that seem most appropriate in the West there may be  
8           a number of proposals that may be quite small, so there may  
9           be some degree to which reducing proposal costs could  
10          benefit Western interests.

11           And, finally there was a feeling that there was a  
12          certain crap-shoot quality to this process if you were a  
13          proposer, because there were ambiguities, especially if  
14          this was your first Government deal. Many people were  
15          struggling with: "Should I propose? What are the chances  
16          of having my proposal seriously considered?"

17           Basic conclusion: PON III, all coals, all  
18          technologies; and it should be made very clear that the  
19          front end of the fuel cycle is a priority matter for PON  
20          III, all of which translates into an opportunity for Western  
21          coal to really play in the game.

22           Number 2: and this was from that two-thirds that  
23          had never done business with the Federal Government before,  
24          and the feedback from those who had: write PON III in plain  
25          English, and model it the way people in the private sector



1 would write proposals if they weren't writing them to the  
2 Federal Government. In other words, try to accommodate a  
3 little bit to the real world out there.

4 Number 3: recognize the decision making process  
5 that the private sector goes through in formulating a  
6 project. People who put a project together have to deal with  
7 their Boards of Directors, and they make staged decisions  
8 about making commitments of resources, time, assets, and so  
9 forth. That's also true of the people who are financially  
10 backing it.

11 To the extent possible, try to adapt the decision-  
12 making and commitment process of the clean coal Federal  
13 Government side to recognize that, and try to parallel those  
14 decisions. A lot of different ideas were discussed on how  
15 to do that, but the bottom line is: We need to be  
16 structuring the process in a way that is more compatible  
17 with the private sector has to make decisions, and that  
18 translates right back to the front end: Make it simpler and  
19 cut down on the proposal costs.

20 It's the front end of the fuel cycle that seems to  
21 be the area where people are most interested and believe, to  
22 the greatest degree, that there were real Western coal  
23 projects likely to materialize.

24 My last point really has to do with the process  
25 again. There is a lot of frustration because the decision-



1 making process the Government uses is a paper decision  
2 process. There is no opportunity for face-to-face dialogue  
3 for clarifications, and for negotiations, prior to  
4 selections. The private sector is used to doing business in  
5 negotiating kind of environment, but in the Clean Coal  
6 Program you don't get to do any negotiations until after  
7 you've been selected. There was a lot of frustration. It  
8 wasn't clear what we could do, but at least we've decided  
9 maybe with lawyers present we could clarify things in  
10 proposals.

11 I guess I'll leave you with this thought: Many  
12 people have spoken today about various perceptions or  
13 misperceptions, and there were a number of them that came up  
14 and were discussed in our group.

15 I think it is very important in Round 3 that we  
16 find a way, we, the Federal Government, find a way to  
17 communicate to you very clearly what PON 3 is, and what it  
18 is not, and that you help us spread that word so people have  
19 a very clear perception of what this third round is going to  
20 be, because perceptions are what people act on. In closing,  
21 I would like to thank Gerry Groenewold, Director of the  
22 Energy and Mineral Research Center - University of North  
23 Dakota, for his assistance during the group session and with  
24 the preparation of this summary.

25 MR. MILLER: Thanks, Dave



1 I'm not going to establish a precedent and have  
2 our meeting wind up precisely on schedule, so what I would  
3 like to do is take this opportunity to open the floor for a  
4 few brief moments under this thesis: That all of you were  
5 in one of four groups. If you have any significant point  
6 that you want to have clarified that one of the moderators  
7 may have addressed, we'll give you this opportunity for one  
8 more comment, statement, or a question. If not, then you  
9 can get out of here.

10 MR. VOELKER: Oh, you shouldn't have said that  
11 last part.

12 MR. MILLER: I will emphasize while you're  
13 thinking about it, one thing that was stated today needs to  
14 be restated. We are having another public meeting in Denver  
15 in the middle of January with the same working format.  
16 However, there will be opportunities for hearing different  
17 subjects expressed in perhaps a different manner, and it  
18 will have the one added feature that we've not had in our  
19 previous public meetings: that is, the hour session devoted  
20 to procurement and the procurement activity phase of this  
21 particular solicitation.

22 Obviously you've heard the moderators make the  
23 statement that in each one of their groups the way we do  
24 business is a difficult concept to entertain and perhaps  
25 respond to. This will give you a one-on-one opportunity to



1 explore some of those opportunities with a representative, a  
2 good spokesman from our Office of Procurement.

3 Now then, does anybody have any comment or  
4 question, points to make that we haven't made? Again, once  
5 again, thanks to everybody, all of those from my staff and  
6 from the other staffs in DOE that helped make this a  
7 success, and also to each of you for coming. Thank you very  
8 much.

9 (Whereupon, at 4:45 p.m. the above hearing was  
10 concluded.)

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**SPEECH BY J. ALLEN WAMPLER OF NOVEMBER 2, 1988**

**"CLEAN COAL TECHNOLOGY - THE NEED  
FOR A PROGRESSIVE REGULATORY ENVIRONMENT"**

**REMARKS TO THE COAL MARKET STRATEGIES  
CONFERENCE IN DENVER, COLORADO**



# FOSSIL ENERGY SPEECHES

U.S. DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

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## Clean Coal Technology

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### The Need for a Progressive Regulatory Environment

**T**his conference gives me the chance to talk about what is happening in the coal and utility industries and perhaps, wrap it up into one, hopefully cohesive view of the future.

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*Remarks by  
J. Allen Wampler  
Assistant Secretary  
for Fossil Energy  
to the Coal Market  
Strategies Conference in  
Denver, Colorado  
November 2, 1988*

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Now please recognize, my crystal ball is no better than anyone else's. Certainly there are other speakers in this conference who bring a unique perspective to the topic of coal market strategies. They, in fact, are living and working in the market. They are competing both here and overseas. They are seeing firsthand the changes I'm going to talk about. And most importantly, they — along with you — will be the ones who will determine whether my view of the future is ultimately judged to be incredibly insightful or hopelessly offbase.

We are seeing some fundamental changes taking place in the business of generating power. We are seeing changes in social values, in consumer expectations, in public policies, and perhaps tying it all together, changes in the technology of power generation. Together, these changes are redefining the future of the power industry.

Coal is clearly part of that future. It is the dominant part of that future. When we started the decade of the '70s, coal supplied 45 percent of our electric power. Now as we approach the end of the decade of the '80s, coal-fired generation is approaching 60 percent of our power mix.



## Fossil Energy Speeches

The coal industry is about to record a record year of production. The National Coal Association has revised upward its '88 numbers. It now looks like increasing demand, brought on largely by hot weather and this summer's drought, will push coal production to 940 or 945 million tons—easily exceeding last year's record of 917 million tons.

And as coal demand is on its way up, the cost of coal has actually come down. Through June of this year, delivered coal to all but the smallest of the nation's utilities averaged just over \$31 a ton. That's the lowest costs have been this entire decade.

So, at first glance, the future of the coal industry—particularly as it concerns electric power—appears to be on solid ground. Notwithstanding the roller coaster ride of world oil prices, the coal industry looks to be in pretty good shape as we enter the decade of the 1990s. But is that the case? Is that really true?

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*Assumption number one is that we recognize that, every once in a very long while in the history of an industry, there comes a brief moment that largely determines its future. And assumption number two is that for the coal and utility industries, that moment is now.*

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My crystal ball tells me it is—if I make two very crucial assumptions. Assumption number one is that we recognize that, every once in a very long while in the history of an industry, there comes a brief moment that largely determines its future. And assumption number two is that for the coal and utility industries, that moment is now.

The future vitality of these industries for at least the next generation is being determined today. Several elements are converging—regulation and regulatory reform, environmental policy, and new technology. And together, changes occurring in each of these are bringing us to a pivotal point. How we respond right now—not in 5 or 10 years—will largely determine whether the nation ever achieves the full potential of its coal resource.

Let me tell you what I mean.

First, the regulation of electricity. To a nation accustomed to the flip of a switch, electric power has become one of life's few certainties.

It must be there when we want it—and in the quantities we need at the prices we want to pay. And that is how it should be. But is that the way it is going to be in the future?



This summer, Harvard University was forced to close its doors for only the third time in its 350-year history. Why? Because electrical demand had reached such high levels that utilities were issuing emergency appeals for cutbacks. Consolidated Edison was rationing power. Three times this summer, surgeons at New York's Mount Sinai Hospital had to operate with electricity from their emergency generators, because voltage from the commercial grid had dropped below the danger level. New England, which could once boast, along with the rest of the country, of having power to spare, saw its reserve margins cut to the lowest in post-World War II history.

But it wasn't just New England. American Electric Power Company, serving seven million customers in seven states from Michigan to West Virginia, hit demand peaks it wasn't expecting until 1996.

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*Has public and regulatory policy focused so much attention on "least cost planning" and its accompanying emphasis on conservation and load management, that the supply side has been ignored for too long? And we haven't seen the boulder coming down the hill.*

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The question we must ask ourselves is this: Was this summer a blip on the curve? Or is it a preview of the future? The chairman of the parent company of Florida Power put it this way, saying "Electricity is the flame of life and it will never go out. But it is about to flicker."

And so we must ask ourselves: Has public and regulatory policy focused so much attention on "least cost planning" and its accompanying emphasis on conservation and load management, that the supply side has been ignored for too long? And we haven't seen the boulder coming down the hill.

Now don't get me wrong. I am an advocate for improving energy efficiency and encouraging energy conservation. We need to be concerned with the demand side of the equation.

EEl did a survey a couple of years ago. They looked at 89 electric utilities nationwide whose kilowatt-hour sales represented three-quarters of the entire electricity market.

They found that demand-side management was being pursued. More than half of the utilities had adopted programs for residential conservation audits, insulation and weatherization, and other options for reducing or managing electricity demand. More than 40 percent had other innovative programs in place -- heat pumps, efficient water heating, efficient lighting, efficient air conditioning, industrial time-of-use rates, and the like. New England, along with California, stood out as having the most ag-



gressive programs.

And yet, the New England Power Pool implemented voltage reductions to eastern Massachusetts 10 times this summer. And the Boston Chamber of Commerce estimated that brownouts and other shortages cost the State of Massachusetts nearly \$87 million this past year. We must be concerned that the reliability problems of this summer have the potential to turn into widespread power shortfalls in the 1990s.

So what about the supply side? How does a utility in today's unpredictable world plan for the future? How does it build new capacity in a time when the regulatory structure is tilted against capital intensive expansion—at a time when public opinion seems to be turning more toward complacency about energy and energy security?

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*We need to change our message. We need to take the offensive and begin talking about what the new generation of coal technology means to ratepayers, what it means to the future reliability of this nation's power supply, and what it means to this nation's future economic growth.*

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Well, it can begin by opening up a dialogue with state utility commissions to ensure that regulatory policies make sense. Perhaps the past has been too confrontational. Perhaps what we need most today is a more open discussion of the future of power generation—a future that is being reshaped by new concepts and new technologies.

We need to change our message. We need to take the offensive and begin talking about what the new generation of coal technology means to ratepayers, what it means to the future reliability of this nation's power supply, and what it means to this nation's future economic growth.

I'm going to talk, in a few moments, about some of these technologies—and about the Clean Coal program we have to demonstrate their commercial viability. But such a demonstration program makes little sense if it isn't accompanied by progressive regulatory reform.

Take, for example, the issue of prudence reviews.

Public utility commissions throughout the U.S. are increasingly using retrospective prudence to disallow millions of dollars of costs in a utility's rate base. The propensity to second-guess utility decisions has already become life-threatening to some nuclear utilities. And it could also become a severe impediment to non-nuclear facilities—particularly those employing innovative technologies.



I have yet to meet a utility executive that didn't wish that prudence reviews would die a silent, but sudden death. But that isn't going to happen. Prudence reviews are viewed as protection for ratepayers that aren't in a position to control investment decisions. Or at least that is how it will be defended.

So utilities that go in and argue for blanket removal of prudence reviews are in for tough sledding. But a utility that goes in and focuses its argument on the most objectionable part of the prudence philosophy is likely to meet with greater success.

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*"Prudence" has been most frequently applied to construction cost overruns and plant cancellations. But now PUCs are also using it to review costs associated with excess capacity – the so-called "used and useful decisions." That, to me, is the bigger obstacle to plant construction – and it is an obstacle that hits hard on a utility whether it is proposing a nuclear plant, a conventional coal plant, or a new clean coal technology plant.*

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Prudence has been most frequently applied to construction cost overruns and plant cancellations. But now PUCs are also using it to review costs associated with excess capacity – the so-called "used and useful decisions."

That, to me, is the bigger obstacle to plant construction – and it is an obstacle that hits hard on a utility whether it is proposing a nuclear plant, a conventional coal plant, or a new clean coal technology plant.

A utility in 1977 could never have predicted the rise to power of an Ayatollah Khomeini. It could never have forecast the rising price spiral on world oil markets ignited by the war between Iran and Iraq. It could never have predicted the worldwide recession that accompanied the first years of this decade. And yet, much of the capacity that came on line during that time has been deemed not to be "used and useful" and has not been allowed in the ratebase.

It is time to make prudence make sense, and to me, this is where reforms should begin. And I believe reforms are possible. But it involves a constructive dialogue between utility and regulator – and between utility and ratepayer. Look at the State of Ohio. It has adopted a very progressive attitude toward the reward of risks within their regulatory framework.

There are changes occurring on the utility landscape. And these changes require a new look at the regulatory process at both the state and federal level.

Electricity generation is no longer a natural monopoly. A whole new industry of non-utility power producers has emerged. We now have a market made up of cogenerators and



independent power producers, who are taking their place alongside traditional utilities.

We have a new era of competition. And there is every reason to believe that coal can fare well in this increasingly competitive environment. Virginia Power recently solicited bids for 1750 megawatts of supply. It received firm bids for nearly eight times that amount. Nearly 60 percent of the bids involved coal-fired technologies, and 84 percent of the capacity chosen was coal-based. We are seeing new technologies like fluidized bed combustor being adopted by several cogenerators. Competition breeds innovation. And that's a good sign.

But we also saw danger signs this last year.

Acid rain legislation came the closest it ever has to passing Congress. We came as close as we ever have to seeing Congress take a direct hand in telling utilities which plants had to be retrofitted and with what technology.

We came as close as we ever have to placing a financial burden in the billions of dollars on the American ratepayer for questionable benefits. And we came as close as we ever have to killing the momentum of new technological innovation that is now underway in this country--and I mean specifically, the Clean Coal Program.

Now before anyone breathes too deep a sigh of relief, let me tell you that the only reason we did not see an acid rain bill this year is because the proponents believe they will have a better chance of getting a tougher bill next year. And if public opinion is any indication, acid rain is the minnow, and CO<sub>2</sub> and global warming may be the shark swimming along behind it. We can't bury our head in the sand and hope that the danger of adverse public opinion passes overhead. The nuclear industry can attest to that.

We are concerned about the recent decision of EPA to subject a life-extension program proposed by Wisconsin Electric to New Source Performance Standards and PSD regulations. We do not want to see utilities in similar situations choose not to life-extend a plant, then as the only alternative, shut it down and replace it with a higher cost system. That could add to our rising oil import levels and derail our efforts to strengthen our energy security.

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But we've also had successes.

I mentioned the Clean Coal Program. If there is one effort that best defines this unique moment in time for the coal-fired utility industry, it is the Clean Coal Technology Program. One month ago, we announced the selection of 16 new projects that, together, represent a \$1.3 billion commitment to the future of this industry. It is a commitment shared by both public and private financing.

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*By the time [the Clean Coal Technology Program] is complete, we hope to have \$5 billion worth of projects in place. If we base our calculation on the second round of selected projects, that \$5 billion will buy us more than 50 projects over the next five years. These are projects that will serve as the fulcrum for this changing era.*

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It is a downpayment as such — an installment, you might say. By the time this program is complete, we hope to have \$5 billion worth of projects in place. If we base our calculation on the second round of selected projects, that \$5 billion will buy us more than 50 projects over the next five years. These are projects that will serve as the fulcrum for this changing era. They balance environmental concerns by offering technologies that can bring emissions down, and most importantly, keep them down for well into the next century. They can fix the problem of acid rain rather than just patching it.

They address the CO<sub>2</sub> problem by significantly increasing the efficiency of power generation, producing in some cases, 10 to 30 percent less CO<sub>2</sub> per unit of electricity produced.

They can meet many of the concerns regarding the future reliability of electric power. The new power generating technologies are, by and large, modular in scale. And I believe that represents the wave of the future. The days of the multi-thousand megawatt giants are over. You can't get them through the regulatory process, and even if you could, the industry has learned from past experience that building power plants that cost more than their net worth simply poses too great a risk.

The modular approach makes better sense from a cash flow standpoint. Phased orders in small increments—100 to 200 megawatts at a time—allow a utility to commit less capital at any one time, and this means lower total interest costs on borrowed capital. Shop fabrication and minimum onsite labor time add to their cost advantages.

They offer reliability advantages. A string of ten 100-megawatt units would be more reliable than one 1000-megawatt unit because it is unlikely that all 10 modules would



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suffer outages at once. Parallel systems became the watchword for reliability in the space and missile program. I think it will become equally important in the utility power market in the future.

The new technologies offer the ability to match capacity additions more closely to load growth—and that should expedite the regulatory process. They offer siting advantages. A gasification combined cycle plant will need only two-thirds as much water as a coal-fired steam plant. It will use only 30 to 50 percent of the land.

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*The 720,000 megawatts of peak generating capacity currently installed or under construction in the U.S. is sufficient only to support a growth rate of 1.5 percent per year through the end of this century. Our economy has been expanding recently at 3, 4 and 5 percent. Every percentage point increase means, roughly, another 100,000 megawatts of additional generating capacity will be needed by the turn of the century.*

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Many of the emerging clean coal technologies can be installed at existing plant sites and boost the output of the original plant—in some cases, more than doubling it.

Look at what that means to a nation that should be increasingly concerned about an approaching electricity gap? Since the Arab oil embargo, total energy usage has declined in relationship to economic growth. But that has not been the case with electricity demand. It has increased almost in lock-step with GNP.

The 720,000 megawatts of peak generating capacity currently installed or under construction in the U.S. is sufficient only to support a growth rate of 1.5 percent per year through the end of this century. 1.5 percent!

Our economy has been expanding recently at 3, 4 and 5 percent. Every percentage point increase means, roughly, another 100,000 megawatts of additional generating capacity will be needed by the turn of the century. Even at modest rates of demand growth—2 or 2 and 1/2 percent—we will need more new generating capacity than the entire generating system of Great Britain—or that of Germany or Japan.

We simply won't get it by betting our future on a new wave of grassroots plant construction. But we can meet a major portion of the increasing demand by repowering existing plants with new clean coal technology—getting the equivalent output of 1 and 1/2 or 2 plants from an existing site, and reducing emissions while we are at it.

That's the moment in time offered by the Clean Coal Program. It is literally a once-in-a-lifetime opportunity for the



coal and utility industry. We can now look over the horizon and see a new suite of technologies that meet environmental concerns—technologies that can be called upon by an increasingly competitive power market, that offer advantages for both ratepayers and taxpayers—technologies that have a better chance of getting through the regulatory process if regulators understand their long-term, life-cycle benefits.

We may not have this chance again. And it is important that we take advantage of it.

Speaking for this Administration, we plan to give this emerging suite of technologies its best shot in the market. We have in place the Clean Coal program, providing matching funds for first-of-a-kind demonstration projects. We believe very strongly that this program can fundamentally change the outlook for clean, reliable electric power in this country. So it is important that it be a national program—not one confined to a particular region of the country. We want to see more Western projects in the next round of competition due to start next May—and we will be making a special effort to encourage potential western proposers. The Clean Coal program is a national program with national benefits.

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*We believe very strongly that this program can fundamentally change the outlook for clean, reliable electric power in this country. So it is important that it be a national program—not one confined to a particular region of the country. We want to see more Western projects in the next round of competition due to start next May...*

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But these benefits will only be recognized if the technologies can be replicated and deployed into the market. And that means a new look at our regulatory structure. We will soon be receiving the results of a year-long study by our National Coal Council that will reinforce the importance of a progressive regulatory environment. That study, along with others, will give us the basis to propose some specific regulatory provisions at the federal level that could ultimately serve as a model for similar state actions.

Yes, times are changing. The world is changing. The linkage between a sound economy and reliable electric power is again being driven home as a critical issue—or if it isn't, it should be. There has never been a more important time for regulators to recognize that innovation is fundamental to economic progress—and to recognize that innovation requires a fair and equitable regulatory structure.

We have a moment in time. We have an opportunity to build a future based on a reliable, economic and environmen-



## **Fossil Energy Speeches**

tally clean supply of coal-based power. Competition within the power industry takes us part of the way down that road. The Clean Coal demonstration program gives us the vehicle and the push we will need. And a progressive regulatory environment, at both the federal and state level, will help us complete the journey.

And that may be the best way to ensure that my crystal ball is accurate.



**U.S. ENERGY POLICY 1980-1988, DOE S/-0068, OCTOBER 1988, EXCERPT,  
CHAPTER FIVE**



# **UNITED STATES ENERGY POLICY 1980-1988**



**U.S. DEPARTMENT OF ENERGY  
WASHINGTON, D.C.  
OCTOBER 1988**



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## Chapter 5

# Coal

*There is no way that this country can ignore the great source of energy—the greatest source of energy as to quantity that we have—and that is coal.*

**President Reagan**  
**October 15, 1984**

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## Chapter 5

# Coal

## History

Coal is the Nation's most abundant fossil fuel resource. It can increase U.S. energy security by reducing our dependence on insecure foreign oil imports. Coal consumption is up since 1980, currently supplying nearly 22 percent of the energy consumed in the United States, compared to 20 percent in 1980. There are about 480 billion tons of recoverable coal in the United States—31 percent of the world's coal resources and more than 50 times the energy equivalent of proved U.S. oil reserves. More than 5,000 mines and nearly 170,000 miners produce more than 900 million tons of coal annually; yet the Nation has unused mine capacity of perhaps another 100 million tons.

*There are about 480 billion tons of recoverable coal in the United States . . . more than 50 times the energy equivalent of proved U.S. oil reserves.*

The history of American progress is inextricably linked to the history of coal. With the coming of the steam engine, the production and use of coal in the United States soared. In the last half century, however, coal gradually lost its dominance as other energy options became more readily available. Coal's chemical and physical properties vary widely, it is relatively difficult to handle and transport, and it requires substantial storage space. Environmental concerns arose that left Americans viewing coal as the symbol of *smokestack* industries—a resource offering much in terms of energy and economic security, but only at the expense of the environment. Even with a substantial price advantage, coal cannot compete with oil or natural gas in many applications because of the added processing, handling, storage, waste disposal, and pollution control costs.

Today, only in large installations—utility powerplants and large industrial boilers—is coal generally economic and environmentally suitable. In these markets, however, particularly in the electric utility industry, coal use has expanded greatly in the last decade. More than half the Nation's electricity—57 percent—is generated from coal. Utilities burned nearly 400 million tons in 1974, approximately 70 percent of U.S. coal consumption. By 1987, utilities were using more than 700 million tons annually, accounting for 85 percent of domestic coal use.

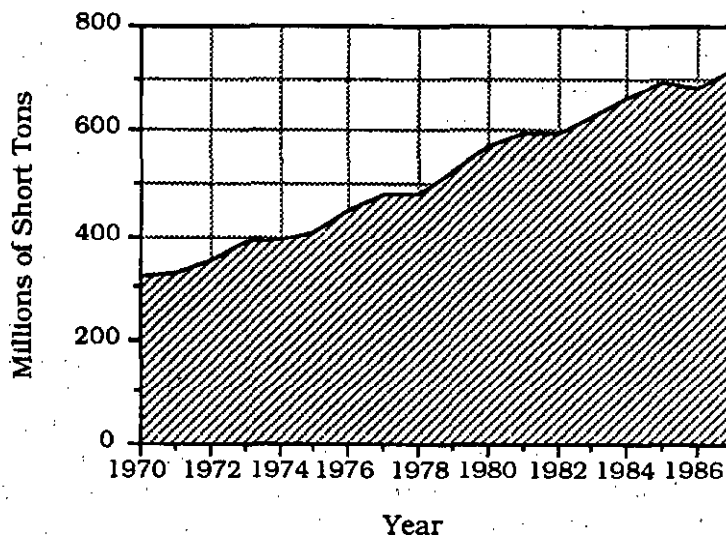
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*Industry spent \$17 billion to install and operate flue-gas scrubbers and another \$11 billion on technology for removing a portion of the sulfur from coal before the combustion process.*

Since passage of the *Clean Air Act* in 1970, U.S. industry has spent \$225 billion to control air emissions. Of this enormous financial commitment, \$60 billion was spent by the Nation's utilities for the reduction of sulfur dioxide alone during the 10 years from 1975 to 1985. Industry spent \$17 billion to install and operate flue-gas scrubbers and another \$11 billion on technology for removing a portion of the sulfur from coal before the combustion process. Because of this huge investment, the Nation's air is cleaner today than it was just 10 years ago. Sulfur-dioxide emissions from all sources have dropped 28 percent since their peak in 1973. Coal-fired powerplants have reduced sulfur emissions by more than 11 percent in the last 10 years.

Increasing concern about possible global climate changes and depletion of the stratospheric ozone layer has spurred research in the United States and abroad. Research started in the late 1970s has provided early warning of problems. Monitoring of the impacts of chlorofluorocarbons has established U.S. scientific leadership in assessing the danger of stratospheric ozone depletion. The study of carbon dioxide and other *greenhouse* gases by the Department of Energy, and other U.S. agencies has provided some scientific evidence that global warming is occurring, but considerable uncertainty remains about how and when the effects will be manifested. (for further discussion of global climate change, see Chapter 10, Environment.)



**Figure 5-1: Coal Use by U.S. Coal-Burning Powerplants**



Over the past 15 years, to decrease their dependence on imported oil, most industrialized nations have increased their reliance on coal, gas, and nuclear energy. The volume of world coal trade almost doubled between 1973 and 1985. However, since 1981 the U.S. share of the world market has declined. Although handicapped by relatively long mine-to-port distances and the higher sulfur content of many low-priced Eastern coals, the United States entered the 1980s supplying roughly one-third of the world's metallurgical and steam coal markets. Annual exports had increased from 40 million tons in 1970 to a record 113 million tons in 1981. Yet by 1984, the U.S. market share had dropped to one-fourth, and Australia became the world's leading coal supplier.

## Reagan Administration Policies, Initiatives, and Accomplishments

For coal to fulfill its potential as a prime domestic energy resource, technological and regulatory barriers limiting its ability to compete with oil and gas must be removed. The objective of the Reagan Administration's five-point coal policy is to make coal competitive, clean, and more convenient to use by:

- Implementing the *Clean Coal Technology Program*;
- Maintaining an effective Federal coal research and development (R&D) program;
- Removing regulatory disincentives that impede coal use;
- Ensuring a more competitive U.S. coal transportation system; and
- Pursuing a more aggressive coal export program.

*For coal to fulfill its potential as a prime domestic energy resource, technological and regulatory barriers limiting its ability to compete with oil and gas must be removed.*

### Implementing the Clean Coal Technology Program

In March 1987, President Reagan announced an expanded clean coal technology program to demonstrate, in partnership with industry, a new generation of coal-burning technologies—clean and highly efficient processes that can increase the Nation's use of coal without compromising its environmental goals. The program envisions \$2.5 billion in matching Federal funds over 5 years (1988-1992) for near-commercial scale projects employing post-R&D technologies. The



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President is offering Federal funds for *clean coal* demonstrations because of two concerns:

- Mounting pressure for a more aggressive strategy for curbing acid rain; and
- Increasing recognition that emerging coal technologies offer the potential for improving future U.S. energy security and gaining a competitive advantage for the country.

The Department of Energy kicked off the first phase of its *clean coal* program in 1986, with seven cost-shared projects involving such technologies as pressurized fluidized bed, combustion repowering, advanced cyclone combustors, gas reburning and sorbent injection, coal-oil coprocessing, underground coal gasification, and integrated coal gasification/combined cycle. Negotiations on additional projects should be concluded by September 1988.

In December 1987, Congress approved \$575 million for fiscal years 1988 and 1989 for a second round of projects. In May 1988, the Department of Energy received 54 proposals valued at more than \$5.3 billion, including \$3.1 billion in private funding and \$2.2 billion in Federal funding—a 3-to-2 ratio of private to public funds, well above the minimum 1-to-1 cost-sharing ratio.

*Clean coal* technologies, if fully developed and deployed, could greatly reduce the cost of generating electric power and yield enormous benefits for consumers. Over the next two decades, the United States could add as much as 150 gigawatts of new capacity—more than the generating capacity of Japan, Germany, or the United Kingdom. The Electric Power Research Institute estimates that if *clean coal* technologies are used, U.S. ratepayers could save \$60 billion in powerplant construction costs alone.

... if *clean coal* technologies are used, U.S. ratepayers could save \$60 billion in powerplant construction costs alone.

### **Maintaining an Effective Federal Coal R&D Program**

In past decades, the federal Government typically supported virtually all phases of R&D—from basic research through proof-of-concept and commercial demonstration. In the 1980s, Federal emphasis shifted to the initial stages of research where the potential for substantial improvement over current technologies is great, but where the risks may be too high to warrant significant private investment. This new emphasis has permitted the Department of Energy to

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concentrate on improving fundamental understanding of coal processes, filling in technical gaps, and exploring new approaches that offer potential for important breakthroughs. DOE's coal R&D program focuses on three areas:

- Developing combustion and engine concepts as well as new fuel forms to facilitate coal use in industrial, commercial, residential, and transportation applications;
- Improving the efficiency and economics of electric utility power generation; and
- Developing new and more economical ways to control pollution from coal combustion.

Some of the most promising coal technologies include the following:

***Atmospheric Fluidized Bed Combustion.*** With atmospheric fluidized bed technology established in the large industrial boiler market, the Department of Energy has turned to removing obstacles preventing this technology from penetrating light industrial, commercial, and residential markets. The goal is a fluidized bed combustor as small as 1,000 pounds of steam per hour—typical for an apartment building boiler—and larger boilers in the range of 75,000 to 100,000 pounds per hour, typical in an industrial manufacturing complex. The Department of Energy also is developing advanced, compact nonfluidizing combustors. By removing sulfur and particulates from coal-derived fuel before it enters the boiler, these systems could allow oil or gas units to be retrofitted to burn coal.

***Coal-Fired Diesel Engines.*** Approximately 40,000 diesel engines, producing nearly 90 million horsepower, serve U.S. electric utilities, basic industries, railroads, inland waterways, and marine shipping. Rail transport uses the major share, 70 million horsepower. During the 1980s, DOE research established the technical and economic feasibility of coal-fired diesels in the range of 250 to 1,200 rpm. The goal is to test an integrated *proof-of-concept* diesel engine, burning a coal-particle fuel, by the end of 1993.

***Coal-Based Alternative Fuels.*** The cost and complexity of handling was a major reason why coal lost favor in many smaller boiler and transportation markets. To help coal reenter these markets, the Department of Energy is

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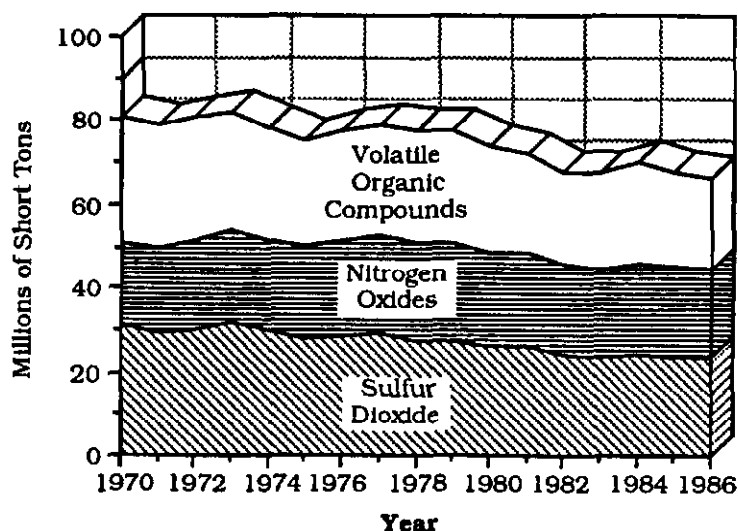


*Tests show the potential for producing liquid fuels from coal at a cost of \$25 to \$30 per barrel, roughly half that projected earlier in the decade.*

developing a variety of new fuel forms from coal. In the 1970s, the emphasis was on synthetic fuels—premium-quality liquids and gases made from coal. When oil prices fell in the 1980s, commercial interest in synthetic fuels faded. Recent technological advances, however, have reduced costs substantially. Tests show the potential for producing liquid fuels from coal at a cost of \$25 to \$30 per barrel, roughly half that projected earlier in the decade. During the 1980s, federally sponsored research helped expand the array of other alternative forms of fuel, and today researchers are experimenting with coal-water-limestone, coal-alcohol, and coal-char slurries, and with ultrafine dry fuels.

**Coal Preparation.** For coal to achieve its full potential, the cost of pollution control must be reduced. New technologies developed in the 1980s in DOE's coal preparation and flue-gas cleanup programs will help ensure that coal keeps pace with environmental requirements and increasing pressures for more economical pollution control. Advanced technologies for cleaning coal by *physical* means could remove as much as 65 percent of the sulfur from certain coals, while longer range *chemical* and *microbial* cleaning might extract more than 90 percent. Both techniques also remove significant quantities of ash-forming impurities.

**Pollution Control Techniques.** New generations of *flue-gas cleanup* techniques, capable of removing sulfur and nitrogen



**Figure 5-2: Decline in Total Emissions of Three Major Acid Rain Pollutants Since Passage of the Clean Air Act**



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oxides, could one day replace sulfur-dioxide-only scrubbers. These devices, also the product of DOE research, will offer the advantage of not producing the waste sludge common to conventional technologies. Moreover, DOE's research on pollutant removal inside existing powerplant ductwork, inside the boiler or in the stacks, shows that a variety of cost-effective concepts are possible.

### **Removing Regulatory Disincentives That Impede Coal Use**

Crucial to the commercial success of *clean coal* technologies, especially in the utility industry, will be the future policies of State utility and environmental regulators, the Federal Energy Regulatory Commission, and the Environmental Protection Agency. President Reagan in March 1987 commissioned his *Task Force on Regulatory Relief* to examine regulatory incentives and disincentives to the demonstration and deployment of new control technologies and other emission-reduction measures. In January 1988, the President accepted three of its recommendations:

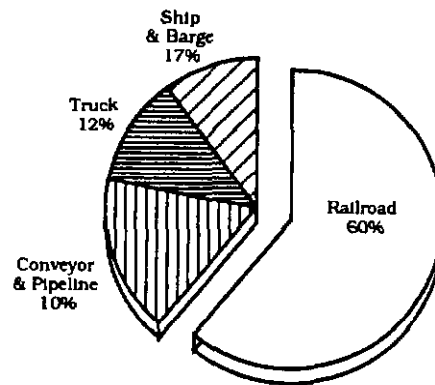
- The *Department of Energy*, when funding demonstration projects through its *Innovative Clean Coal Technology Program*, should consider giving preference to projects in States offering certain regulatory incentives to encourage innovative technologies;
- The *Federal Energy Regulatory Commission*, in setting wholesale electricity rates, should implement a 5-year demonstration program that allows rate incentives to encourage more rapid deployment of innovative technologies; and
- The *Environmental Protection Agency*, in managing the Nation's air quality, should expand the use of commercial demonstration permits for innovative technologies.

### **Ensuring a More Competitive U.S. Coal Transportation System**

Transportation typically represents about 30 percent of the delivered cost of coal in the United States and in some circumstances as much as 70 percent. Coal moves by several modes, but more than 60 percent is delivered by rail. Trucks and conveyors typically are used for short hauls, while barge and rail are used for longer distances.

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**Figure 5-3: U.S. Coal Transportation Modes**

Provisions of the *Staggers Act* protect coal shippers, who are served by a single railroad carrier for all or part of the distance between mines and the point of use, against unreasonable transportation rates and charges. The *Senate Committee on Commerce, Science and Transportation* has been considering revisions to the *Staggers Act* that address concerns of such captive shippers that current protection is inadequate.

Coal transportation also can be improved by deepening some ports and thus allowing larger coal barges and ships access to U.S. coal. In April 1988, President Reagan signed legislation authorizing the cost-sharing of both State and Federal funds to deepen certain channels. Such local-Federal cost-sharing can help make port-improvement decisions more sensitive to market realities.

*In April 1988, President Reagan signed legislation authorizing the cost-sharing of both State and Federal funds to deepen certain channels.*

### **Pursuing a More Aggressive Coal Export Program**

Despite lower oil prices, world coal consumption, primarily *steam* coal for generating electricity, is expected to continue rising in the long term. The International Energy Agency projects that coal-fired electric generating capacity in the 24 nations of the Organization for Economic Cooperation and Development (OECD) could grow from just over 500 gigawatts in 1985 to 670 gigawatts by 2000. Close to half this growth will be outside North America. Japan's use of coal is expected to increase almost 50 percent by the end of the century and Europe's by 30 percent, with the largest increases



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in Italy and Germany. Less developed countries will have the greatest growth, almost 60 percent by the year 2000.

The United States is, and will continue to be, a major coal exporter. The domestic coal industry is highly competitive and offers reliable coal supplies. The domestic inland transportation system can handle surges in demand, and coal terminal port capacity has been expanded to 200 million tons. But there must be free and fair trade throughout the world to ensure widespread access to competitively priced coal. The United States is strongly encouraging foreign nations to eliminate subsidies to their domestic coal industries that unfairly inhibit free trade.

To bolster U.S. presence in world markets, the Department of Energy recently instituted several major export initiatives.

**Promoting U.S. Coal and Clean Coal Technology.** These innovative technologies have the potential to be marketed by themselves or in conjunction with U.S. coal exports. Countries such as Italy and some less developed countries that rely on external sources for the majority of their energy supply and have increasing demands for environmental controls are the most promising markets for combined U.S. coal and coal technology exports, while countries such as China that have large indigenous coal reserves are promising markets for coal technology exports.

*These innovative technologies have the potential to be marketed by themselves or in conjunction with U.S. coal exports.*

The United States also is exploring the potential for packaging coal sales with transportation and handling for selected markets, and is developing financial support for coal projects funded through the Export-Import Bank. A coal technology exhibition and coal market conference in the Far East are planned for late 1988 to inform potential buyers about emerging *clean coal* technologies. A series of trade missions by officials from the Departments of Energy and Commerce would follow.

**Bilateral Negotiations.** The United States continues pushing vigorously to expand coal exports to Japan in accord with the 1983 agreement between President Reagan and then-Prime Minister Nakasone. The Department of Energy is including potential U.S. coal sales in negotiations on government-to-government research. The United States currently has coal-related agreements with 14 countries. One of the most

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successful is with Italy, whose aggressive coal policy offers the potential for significantly greater U.S. coal sales. Cooperative R&D efforts with the Italian Government and industry in coal slurries and coal cleaning have heightened Italy's familiarity with U.S. coal, coal suppliers, and equipment vendors.

**Market Information.** To inform U.S. coal vendors and suppliers about overseas opportunities, a system for collecting and disseminating information on foreign coal procurement policies and practices is being developed. The Department of Energy also has commissioned:

- An assessment of the potential for U.S. *clean coal* technology to compete in European industrial and utility boiler markets;
- A survey of commercial and residential coal users in Europe and Asia; and
- A program to identify new market opportunities in less developed countries and establish cooperative agreements between those countries and the U.S. Government and industry.

## Conclusions

In recent years, some countries, notably Australia and South Africa, have won major shares of the world coal market with lower coal prices and aggressive national marketing policies for increasing coal exports. Other countries, such as Poland and Great Britain, have suffered strikes and poor productivity, leading to a decline in their sizable market share. The United States, with coal that costs more at delivery and whose export sales are seen as a marginal market, has acted as the swing supplier in the world market.

The United States, however, has built a solid foundation for expanding the use of coal both domestically and abroad. The *clean coal* program and new combustion techniques have contributed and will continue contributing to new generations of coal-burning technologies—clean, highly efficient processes that can increase the Nation's and world's use of coal without compromising environmental goals.

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**STATEMENT BY JACK S. SIEGEL OF JUNE 22, 1988**

**TESTIMONY BEFORE THE  
SUBCOMMITTEE ON ENERGY AND POWER  
COMMITTEE ON ENERGY AND COMMERCE**



Statement of Jack S. Siegel  
Deputy Assistant Secretary for Coal Technology  
U.S. Department of Energy  
Before the  
Subcommittee on Energy and Power  
Committee on Energy and Commerce

June 22, 1988

Summary Statement

As a result of the billions of dollars spent by U.S. industries, sulfur dioxide (SO<sub>2</sub>) emissions in the U.S. have declined dramatically over the last decade. This has occurred even as coal consumption was increasing by 78 percent.

Future significant declines in SO<sub>2</sub> are also expected as old, higher emitting plants are replaced by new plants meeting stringent air pollution control requirements.

Current technological options for further control of SO<sub>2</sub> from existing plants are limited and problematic. Clean coal technologies offer to expand the suite of control options available for the wide variety of market needs that exist now and will be even more apparent in the future. These advanced technologies will offer significant economic and performance advantages if they are adequately demonstrated and deployed. They will also likely result in deeper and more sustained reductions in sulfur dioxide and possibly nitrogen oxide emissions than those that would result with acid rain control legislation now pending in Congress.

Although general estimates of the economics and dates for commercial deployment of the advanced clean coal technologies can be provided, both are highly uncertain because of the stage of development of the technologies and the many market related factors that make such estimates guesses at best.

Premature enactment of acid rain legislation would have a deep and lasting adverse effect on the development and deployment of clean coal technologies by diverting utility resources from clean coal technology development and demonstration and toward immediate compliance strategies. As a result, to ensure that these technologies are available to meet future needs the following steps should be taken:

1. Enactment of acid rain control legislation should be deferred until the scientific evidence warrants additional controls;
2. Full funding of the demonstration program should be appropriated in advance;
3. Incentives for demonstrating and deploying innovative clean coal technologies should be provided.

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Statement of Jack Siegel  
Deputy Assistant Secretary  
for Coal Technology  
U. S. Department of Energy  
Before the  
Subcommittee on Energy and Power  
Committee on Energy and Commerce

June 22, 1988

Good morning Mr. Chairman and members of the Subcommittee. I appreciate this opportunity to discuss today the Clean Coal Technology Program and its relationship to acid rain legislation.

With the Subcommittee's approval I would like to take a few minutes to describe the downward trends in emissions that have occurred over the last decade. As requested by the Subcommittee, I would then like to discuss the advantages advanced clean coal technologies offer over conventional technology to further reduce emissions in the future, the projected economics of these advanced systems, when they will be commercially available, the barriers to their deployment, the effect that acid rain control legislation would have on their development and commercial deployment and actions that should be considered to ensure the availability of these advanced technologies.

As a result of the more than \$60 billion spent by utilities in the last decade and a half and the additional billions spent by others, sulfur dioxide emissions have declined dramatically. Since the Clean Air Act was passed in 1970, U.S. sulfur dioxide (SO<sub>2</sub>) emissions have dropped about 28 percent from their peak in 1973. Coal-fired power plants nationwide have reduced their SO<sub>2</sub> emissions by 11.4 percent from their 1977 peak through early 1987. This has



occurred even as coal consumption was increasing dramatically, from 389 million tons per year in 1973 to 693 million tons per year in 1985.

Sulfur dioxide emissions reductions from coal-fired power plants in the northeastern U.S., the region receiving the most attention in the acid rain debate, have been even more dramatic, dropping by 19 percent from 1975 to 1984 even as coal consumption in this region increased 23 percent.

Future significant declines in SO<sub>2</sub> are also expected as old, higher emitting plants are retired and/or utilized less and are replaced by new plants meeting New Source Performance Standards and Best Available Control Technology emission levels. However, current technological options for further control of SO<sub>2</sub> from existing plants are limited to coal preparation, coal switching and flue gas scrubbing.

Conventional coal preparation, used today to clean about 2/3 of the coal produced east of the Mississippi River, can only remove 20 to 40 percent of the pyritic sulfur or 10 to 30 percent of the total sulfur in coal.

Switching from high sulfur coal to lower sulfur coal, although presently a moderately inexpensive control option for some plants, would result in the dislocation of coal miners and concomitant adverse regional economic impacts.

Flue gas scrubbing, although effective for controlling high percentages of SO<sub>2</sub>, is very costly both economically, where the cost of a scrubber could exceed the cost of the boiler it would be installed on, and in performance efficiency, where it would drain 5 to 8 percent of the energy produced by a



power plant. In addition, none of these options do anything for the control of NOx, another pollutant on which debate focuses.

A new generation of advanced coal technologies -- the Clean Coal Technologies -- now emerging from the research and development process, offer the potential for significant economic, performance and environmental advantages for the wide variety of market needs that now exist. Their utility will be even more apparent in the future. In fact, as the Electric Power Research Institute (EPRI), DOE and others have agreed, if given the opportunity to be demonstrated and commercially deployed, these technologies would result in deep and sustained reductions in SO2 and possibly NOx emissions through normal market forces.

#### Advantages of Clean Coal Technologies

The suite of Clean Coal Technologies address the problems of emissions control through precombustion cleaning of coal, new coal combustion techniques which inherently remove SO2 and NOx, post combustion cleanup of coal combustion gas streams, and coal conversion systems which convert coal to clean liquids and gases for various market uses. Most of the technologies can be applied to existing sources for pollution control, power generation, and/or conversion from oil or gas to coal. They can also be used for new, grass roots facilities to produce power, generate steam, or even run locomotives. Many of these technologies can likely be combined to meet market needs more cost-effectively and efficiently, with excellent environmental benefits.



The new clean coal power generating technologies which inherently control pollution as part of the process include Integrated Gasification Combined Cycle (IGCC), and Pressurized and Atmospheric Fluidized-Bed Combustion, among others. They have the potential to offer thermal efficiencies of 45 to 50 percent as compared with 36 percent for conventional pulverized coal fired boilers with scrubbers.

They will not only meet, but exceed, federal New Source Performance Standards (NSPS). For example, IGCC has a proven capability of 99 percent sulfur dioxide removal. Fluidized-bed combustion combines 90 to 95 percent SO<sub>2</sub> removal with NO<sub>x</sub> emissions 50 percent lower than NSPS.

Some advanced power generating technologies can be shop fabricated and built in modules of 100 to 300 MWe. This allows utilities to look at a short time horizon in estimating their power generation needs and to reduce considerably the capital required during construction. They are fuel flexible in that they can burn any grade of coal and, in some cases, waste materials, wood, and other fuel types.

These technologies can be used not only for the generation of electricity at new, grass-roots sites but can repower existing facilities to increase their power output, reduce emissions and extend its useful life. This option can resolve many of the problems likely to be encountered in siting new plants while at the same time improving the availability and reducing the emissions of older, inefficient boilers. For example, Integrated Gasification Combined Cycle technology, when used to repower an



existing coal boiler, can increase the power output by 150 to 170 percent, reduce SO<sub>2</sub> emissions by 99 percent and extend the life of the plant by up to 30 years.

Retrofit technologies such as Advanced Combustors, Coal Water Slurries, In-Duct Sorbent Injection, Reburning, Limestone Injection Multistage Burners, Advanced Coal Cleaning, and others, by themselves or in combination, have the potential to:

- 1) Control NO<sub>x</sub> as well as SO<sub>2</sub>
- 2) Reduce the costs and energy penalties of pollution control
- 3) Apply to the full range of existing boilers, including those that are site constrained
- 4) Apply to the full range of U.S. coals
- 5) Produce wastes that will be more benign, marketable, or easily disposed of than those produced using present control techniques.

DOE'S Coal Program consists of two major elements -- the research and development (R&D) program and the demonstration program. The R&D program supports basic and applied long-term, high-risk research through proof-of-concept scale. It is the technological pipeline which feeds the other major element of the program, the clean coal technology demonstration program. The demonstration program acts as the bridge between R&D and



commercial deployment of the technologies. Its goal is to collect the technical, economic, environmental and other information needed for private sector commercialization decisions to be based. Risk-sharing is accomplished by the Department of Energy providing up to 50 percent of the cost of each demonstration project and private industry providing the remainder.

### Economics of Advanced Clean Coal Technologies

DOE's projections indicate that the anticipated life-cycle costs of the advanced clean coal technologies will likely be lower than conventional technology. However, providing precise cost estimates may not be possible at this time. This is because cost is directly related to the process configuration used, site specific factors such as land availability, boiler type, age and size, coal type used, ducting available, existing pollution control equipment, etc. As an example of the difficulty of estimating costs, we looked at the costs of the same sized scrubber having the same characteristics but installed at two different sites to find the capital costs differing by 25 percent.

Some generalizations can be made, however. Estimates for the costs and performance of retrofitting and repowering existing facilities with conventional and advanced technologies are provided in Figure 15 of America's

Clean Coal Commitment, which the Department of Energy published in February 1987. In addition, more detailed cost and performance estimates for Integrated Gasification Combined Cycle and Pressurized and Atmospheric



Fluidized-Bed Combustors were provided in DOE's December 1987 report The Role of Repowering in America's Power Generation Future. With the Committee's approval, I would like to provide the two reports for the record.

Cost estimates other than those cited in the two reports just referenced are frequently discussed. For example, a common estimate for the cost of a large, 1000 MWe coal-fired power plant with a scrubber is about \$1500 per kw. Based upon the technology demonstrated at the Cool Water plant in Daggett California, the Electric Power Research Institute has quoted cost estimates in the range of \$1300-1500/kw for IGCC. DOE's study "The Role of Repowering in America's Power Generation Future" suggested \$1156/kw for an IGCC system employing hot gas cleanup. Estimates for advanced IGCC systems with hot gas cleanup have been cited by M.W. Kellogg and General Electric as having the potential to drop below \$1000/kw when these systems are commercially deployed.

Although the likelihood of significant economic improvements is high with this new suite of technologies, there is no easy answer to the cost question. More importantly, it must be kept in mind, that these advanced coal technologies are not yet commercially proven. Until they are demonstrated, in some cases demonstrated in multiple units, cost and performance information and therefore vendor guarantees will remain uncertain.

Commercial Availability of Advanced Clean Coal Technologies and Regulated  
Utility Risk Averseness



When the advanced clean coal technologies will be commercially deployed is a difficult question to answer as several barriers to their demonstration and deployment exist.

Regulated U.S. utilities are, in general, risk averse. They are in business to produce reliable power at a reasonable cost. Under the current regulatory climate, regulated utilities receive little if any reward for risk taking. New technologies may offer all the ingredients today's utilities require -- modularity, environmental acceptability, reduced construction time, and improved performance resulting in improved economics and in the long run, reduced risks. However, since utilities are not rewarded for taking risk and may even be penalized for taking risks that result in failure, even the most promising technologies will not be used in large quantities until commercial-scale reliability and performance are assured and the regulatory climate is more conducive to the introduction of emerging technologies.

To reduce the risks of new technology to an acceptable level, demonstrations and in some cases several demonstrations of the same or similar technology may be needed. The number of replications needed depends upon the technology and the specific use being proposed.

Figure 14 in America's Clean Coal Commitment provides the estimated dates that initial demonstrations for a variety of generic clean coal technologies are expected to be completed. Several additional steps would then be required. The time required for the design, permitting, construction



and shakedown of the next demonstration or the first commercial prototype would add 3 to 5 years to the dates shown in Figure 14. If further replications are required, additional time must be added to finally arrive at the dates the technologies will be generally accepted for commercial deployment.

Because of the economic and performance improvements the clean coal technologies offer, in time they may be deployed in considerable numbers through current market forces. This applies both to the power generation/repowering technologies and the retrofit/pollution control technologies. However, the rate of deployment will be dependent upon many factors such as future energy prices; competition; results, number and timing of the demonstrations required; the regulatory climate; the growth in demand for electricity; and the availability of incentives for accelerating demonstration and deployment.

#### Effect of Acid Rain Legislation on CCT Deployment

A considerable amount of money and risk is involved in the demonstration and initial deployment of any new technology. As previously mentioned, utilities are risk averse because incentives currently do not exist that warrant risk taking by regulated utilities. This is true even for technologies that could reduce life-cycle costs for utilities and ratepayers.

In addition, limited discretionary funds are available for utilities and others for research.



As a result, if acid rain legislation is enacted in the next few years, the limited private sector research funds available for new technologies would very likely be redirected towards compliance with the added control requirements and away from the development of advanced technology. In addition, compliance would come from the installation of less risky, conventional technology, even if its cost is likely to be significantly higher than advanced, albeit riskier technological options because these costs can be passed through to the consumer. Lower risk decisions will win out over investment in improved technology. This in turn will result in a near term very costly patching of an environmental problem for which scientists have yet to reach a consensus on either its magnitude or its remedy. The pace of development of more efficient, extremely clean advanced technologies which have the potential to resolve more cost-effectively in the near future any problems that SO<sub>2</sub> and NO<sub>x</sub> emissions may be causing will be slowed if not altogether halted.

#### Acid Rain Control vs. Clean Coal Technology

As I've just discussed, premature enactment of acid rain control legislation would have a very serious and lasting impact on the demonstration and deployment of clean coal technologies. Therefore, the most prudent actions that can be taken to ensure the future availability of clean coal technologies are:



1. Continue funding of the coal technology research and demonstration programs consistent with the President's FY 1989 budget request. This will ensure that promising technologies currently ready for demonstration or in the research and development pipeline are demonstrated by the 1990's.
2. Defer consideration of acid rain control legislation until the scientific evidence and cost-benefit analyses warrants further controls. The interim NAPAP assessment indicated that currently there is no reliable way to predict the outcome of any given regulatory action, and therefore, the Administration suggests that it would not be appropriate to enact new legislative controls until their actual effects could be reasonably predicted. In addition, SO<sub>2</sub> emissions have been declining and should decline even more dramatically in the future, especially if CCT's can be demonstrated and deployed.
3. Provide incentives for the demonstration and early deployment of clean coal technologies. Incentives to reduce risks and provide rewards for utilities regulated by Federal Energy Regulatory Commission, to encourage states to adopt incentives, and to remove barriers caused by certain environmental regulations have been recommended by the President's Task Force on Regulatory Relief chaired by the Vice President and accepted by the President. These and others that may be identified by DOE's Innovative Control Technology Advisory Panel in a study they are now conducting for Secretary of Energy Herrington should act to level the playing field for innovative technologies and therefore encourage and accelerate the demonstration and deployment of promising advanced



technologies..

This concludes my formal statement. Mr. Chairman, I would be happy to answer any questions you and the Subcommittee members may have. Thank you.



**STATEMENT BY J. ALLEN WAMPLER OF APRIL 18, 1988**

**TESTIMONY BEFORE THE  
SUBCOMMITTEE ON THE INTERIOR AND  
RELATED AGENCIES  
COMMITTEE ON APPROPRIATION  
U.S. SENATE**



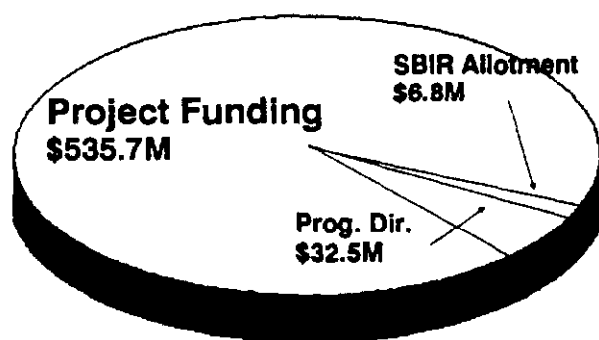
**Statement of  
J. Allen Wampler  
Assistant Secretary for Fossil Energy  
U.S. Department of Energy  
to the  
Subcommittee on the Interior and Related Agencies  
Committee on Appropriations  
U.S. Senate**

Continued Implementation of the President's expanded clean coal technology program undergirded by a sound coal research and development (R&D) effort, a new emphasis on the enhanced recovery of oil, and the initiation of a two-phase cooperative R&D venture program highlight the Administration's FY 1989 fossil energy technology budget request. The following testimony describes these key elements of the budget request as well as providing individual fact sheets on each budget item contained in the proposed Fossil Energy program.

### Introduction

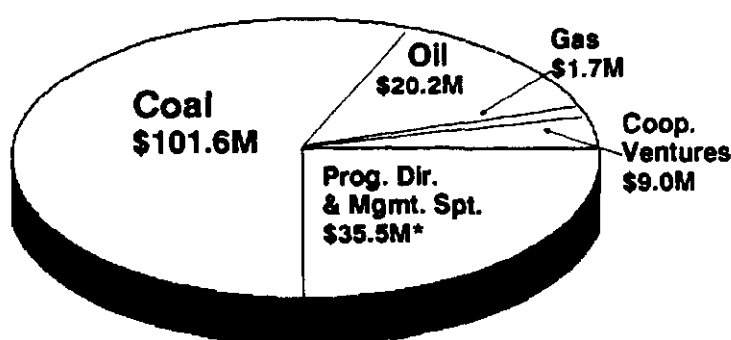
The two major components of the Department of Energy's fossil energy technology program are (1) the Clean Coal Technology Program, which provides cost-sharing for large-scale, near-commercial demonstrations of emerging coal-based technologies, and (2) a diverse array of more fundamental, smaller-scale research and development efforts in coal, oil and unconventional natural gas. The two programs, depicted below with their major funding components, are complementary efforts — the more fundamental R&D efforts generating the new

**Clean Coal Technology  
FY 1988-89**



**\$575 Million**

**Fossil Energy R&D  
FY 1989**



**\$168 Million**

\*Includes Capital Equipment

concepts that are too high-risk or long-term for private sector financing alone, while the Clean Coal Technology Program is providing matching funds to industry to demonstrate the most promising coal concepts emerging from the nation's research and engineering laboratories.

The FY 1988-89 budget for the Clean Coal Technology Program (\$50 million in FY 1988 and \$525 million in FY 1989) reflects the appropriations approved by Congress in Pub. L. 100-202 for the first two years of the President's proposed five-year program. As will be described in this testimony, the Administration proposes to restore reductions made by Congress in the initial funding level by requesting advanced appropriations of \$1.775 billion for FY 1990, 1991 and 1992 to ensure the federal government's full amount of the President's March 1987, \$5 billion, five-year clean coal commitment (\$2.5 billion of which is the federal share).



The \$168 million funding request for the Fossil Energy R&D program (\$167 million when a proposed \$1 million offset is included) is a 53% reduction from the \$354 million appropriated in FY 1988. The funding request is \$17 million higher than the fiscal year 1988 request. As shown by the chart below, six of the nine major categories in the Coal program show proposed FY 1989 increases over their comparable FY 1988 requested levels. The Enhanced Oil Recovery program would increase by more than 75 percent over the department's FY 1988 requested amount. Given current fiscal constraints, we believe the FY 1989 budget request for Fossil Energy R&D is both technically prudent and fiscally sound.

<b>FOSSIL ENERGY RESEARCH AND DEVELOPMENT</b>			
	<b>FY 1988</b>		<b>FY 1989</b>
	<b>Request</b>	<b>Approps</b>	<b>Request</b>
<b><u>COAL</u></b>			
Control Technology & Coal Preparation .....	\$ 29.69	\$ 43.62	\$ 31.49
Advanced Research & Technology Development .....	20.75	24.94	21.41
Coal Liquefaction.....	9.50	27.13	10.30
Combustion Systems.....	21.09	25.17	17.42
Fuel Cells .....	6.58	34.20	6.63
Heat Engines.....	8.30	17.95	9.00
Underground Coal Gasification .....	0	2.78	0.27
Magnetohydrodynamics.....	0	35.00	0
Surface Coal Gasification.....	<u>5.80</u>	<u>22.99</u>	<u>5.03</u>
Subtotal, Coal.....	101.70	233.77	101.55
<b><u>PETROLEUM</u></b>			
Advanced Process Technology .....	2.00	3.43	2.17
Enhanced Oil Recovery .....	9.30	16.54	16.98
Oil Shale.....	<u>0.96</u>	<u>9.50</u>	<u>1.04</u>
Subtotal, Petroleum.....	12.26	29.46	20.19
<b><u>GAS</u></b>			
Unconventional Gas Recovery .....	1.60	10.53	1.73
<b><u>Program Direction &amp; Management Support</u></b>			
Program Direction .....	38.44	61.84	34.78
Federal Inspector - Alaskan Gas Pipeline.....	<u>0.23</u>	<u>0.23</u>	<u>0.25</u>
Subtotal, Prog. Dir. & Mgm't Spt.....	35.70	62.08	35.03
<b><u>Plant &amp; Capital Equipment</u></b>			
Capital Equipment .....	0.48	0.48	0
Construction.....	<u>0.0</u>	<u>17.75</u>	<u>0.50</u>
Subtotal, Plant & Capital Equip. ....	0.48	18.23	0.50
Cooperative Ventures .....	4.50	0	9.00
Offsets.....	<u>-6.10</u>	<u>-27.10</u>	<u>-1.00</u>
Total.....	\$149.65	\$326.98	\$167.00

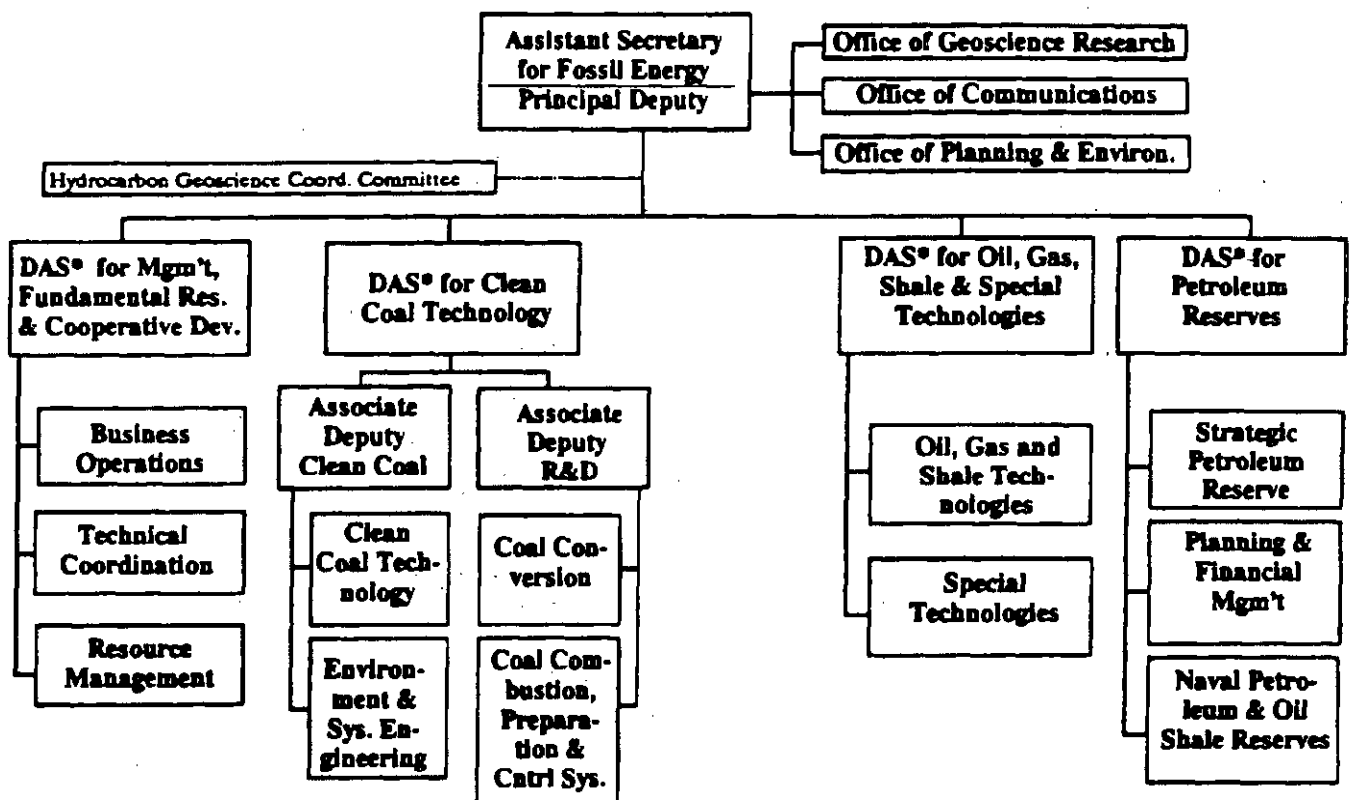


## Fossil Energy Organization

To implement the expanding Clean Coal Technology Program and to ensure that it remains closely aligned to the ongoing related coal R&D programs, significant changes were made in the Office of Fossil Energy's headquarters organization effective on February 29, 1988. The revised organization also realigns several supporting functions within the organization to reflect more accurately the day-to-day operations of the program.

Simultaneously with the organizational restructuring, several senior-level Fossil Energy management officials have been given new assignments within the headquarters organization. These changes will help to ensure that the Office of Fossil Energy benefits from new ideas and management approaches and that expertise gained in one research area can be transferred and applied in other programs. The new Fossil Energy organization is depicted below:

### New Fossil Energy Headquarters Organization



\*DAS – Deputy Assistant Secretary

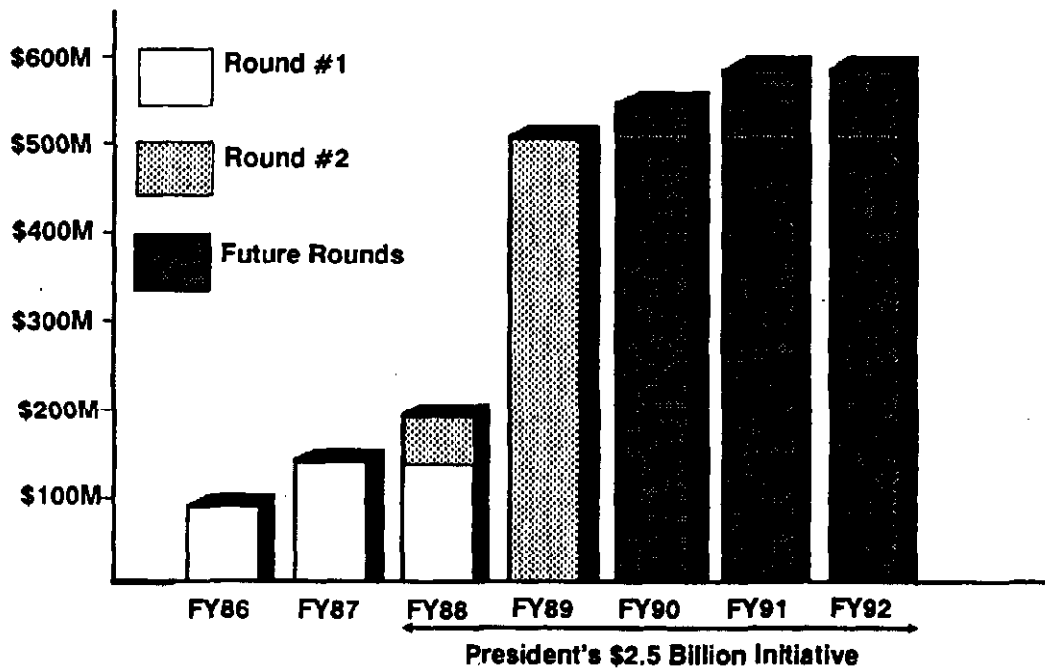


### Key Elements of the Budget Proposal

**Innovative Clean Coal Technology** - The President's commitment on March 18, 1987, to request the full amount of funding recommended by the U.S.-Canadian Special Envoys on Acid Rain placed this nation on an aggressive course toward becoming the world's showcase of new, highly efficient, clean-burning coal technologies. The Innovative Clean Coal Technology Program would feature a sequence of competitive solicitations between fiscal years 1988 and 1992. The staggered timetable of solicitations will encourage new, potentially improved clean coal concepts to continue their development progress and to be considered in future competitions.

The \$2.5 billion (federal share), five-year program proposed by the President incorporates a portion of, and builds onto, an ongoing \$400 million effort approved by Congress in FY 1986, as shown by the chart below. The initial effort (FY86-88) has, to date, resulted in the successful negotiation of seven clean coal demonstration projects with a total value in excess of \$757 million (the federal share projected to be \$227 million). Four additional projects are being negotiated to complete the \$400 million "first round" competition. (As the chart shows, the President's five-year program includes \$150 million in FY 1988 funding applied in Round #1.)

**Clean Coal Technology – Funding Profile**



The funding level requested by the Administration last year to implement the FY 1988-89 portion of the President's initiative was \$850 million. Congress approved \$575 million, of which \$535.7 million will be made available in matching funds for cooperative agreements (the remainder is required for program direction and statutory requirements). DOE issued a solicitation on February 22, 1988, to begin the initial round of the expanded clean coal competitive program. Proposals are due on May 23, 1988, and candidate projects will be selected on or before the Congressionally directed deadline (in October).



The President remains committed to implementing the full \$5.0 billion clean coal program within the five years recommended by the Special Envoys. This was reemphasized in a White House statement issued on January 23, 1988. Accordingly, the department is requesting that the remaining \$1.775 billion be made available as an advanced appropriation in FY 1989 to be used for subsequent solicitations in 1990 through 1992 (\$575 million to be made available in FY 1990, \$600 million in FY 1991 and \$600 million in FY 1992).

**Continued Coal Research and Development** -- The FY 1989 budget proposal also maintains a solid core of coal-related research and development. This program, in many respects, provides the "seed money" for advances in knowledge and technical concepts that might ultimately lead to new breakthroughs and innovations in coal technology. While the annual funding level is smaller in comparison to the Clean Coal Technology Demonstration program, the R&D program is of equal importance.

Projects financed under this program are typically smaller in scale, and many are carried out in academic and private sector research laboratories (in contrast to the large demonstration projects that comprise the Clean Coal Technology Program). The value of this more fundamental program, however, is reflected in the significant advances it has fostered in the last decade. For example, since 1980, the coal R&D program has stimulated the development of:

- The **fluidized bed combustion** technique, now commercially deployed in the large industrial sector and gaining a foothold in the utility sector, including commercial-scale projects being financed in the Clean Coal Technology Program;
- **High-temperature gas cleanup** techniques that characterize "2nd-generation" gasification-combined cycle now being demonstrated in the Clean Coal Technology Program;
- The **coal-oil coprocessing** concept, originally studied in the Advanced Research and Technology Development Program, and now being demonstrated in the Clean Coal Technology Program as an economical "bridge" to the future production of synthetic liquids from coal;
- **Coal-slurry mixtures**, also originally studied in the Advanced Research and Technology Development Program, which will likely be a key fuel form for such concepts as the coal-fired diesel and turbine;
- **Underground coal gasification** which has moved from small scale development to the threshold of commercial demonstration during the last decade;
- A new array of **more effective and more economical pollution control devices**, such as electron-beam and copper oxide flue gas scrubbing, and **advanced coal preparation techniques**, many of which rely on such advances as ultrasonic grinding; and
- New insights into potentially revolutionary concepts in **microbial-based coal desulfurization** and conversion.

These advancements will help shape the future of coal technology in the 21st Century. The proposed FY 1989 budget will build on this solid base of technological progress.

In FY 1989 key research efforts will continue in physical and chemical/biochemical coal cleaning, in fine coal cleaning and in advanced flue gas and gas stream cleanup techniques. Work will also continue on novel catalytic, biological and other approaches to coal liquefaction, on benchscale development of coprocessing and/or staged liquefaction, and on the conversion of coal-derived gaseous feedstocks to liquid fuels. Coal gasification research will continue with ongoing efforts in such areas as hot gas desulfurization in entrained flow gasifiers, zirconia oxygen separation, low-energy consumption hydrogen separation and mild gasification.



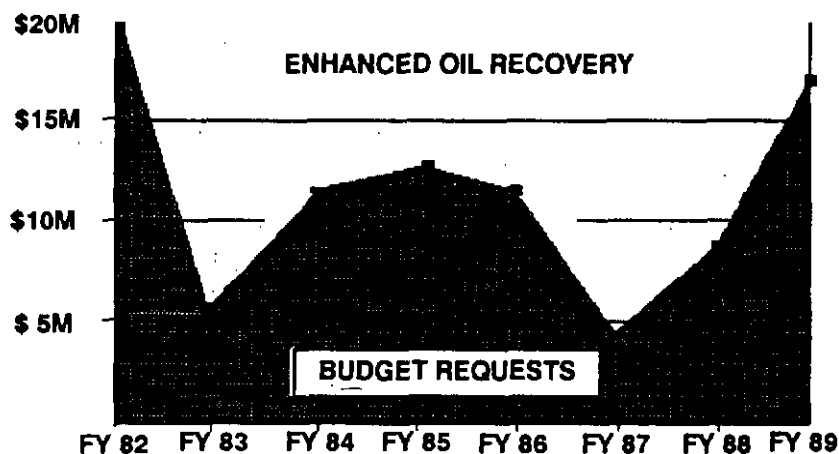
New coal combustion techniques will also continue to be studied with a focus on small scale atmospheric fluidized bed concepts, on key elements of pressurized fluidized bed technology, on advanced, non-fluidizing combustors for industrial, residential and commercial use, and on the transport, handling and combustion of coal-based slurry fuels. The FY 1989 budget also continues development of integrated coal-based gas turbine and diesel engine systems, although the number of private contractors in the program would be reduced. Fuel cell funding would concentrate on resolving remaining technical uncertainties in the molten carbonate technology and continuing the development of the solid oxide technology.

Sufficient funds either exist in the FY 1988 budget or are included in the FY 1989 request to complete several key research efforts, including the Gravimelt coal cleaning process, the fluid bed copper oxide flue gas cleanup technology, the staged coal liquefaction concepts tested at Wilsonville (AL), the liquid phase methanol synthesis technique tested at LaPorte (TX), phosphoric acid fuel cell development, a three-year underground coal gasification field test effort in Wyoming, and the Waltz Mill (PA) integration tests of gasification and hot gas clean-up. As in previous Administration requests, the department is recommending that federal support be withdrawn from the multiyear magnetohydrodynamics (MHD) development effort due to its unaffordable costs, particularly given the diversity of technological options now becoming available to industry.

**Enhanced Oil Recovery Initiative** -- Continued advance of oil production technology is vital to this country. Regulatory reform, tax incentives and other financial measures will not resolve the fact that nearly two-thirds of our oil wealth is inaccessible through conventional recovery. Our target must be the approximately 300 billion barrels of domestic oil that cannot be recovered with today's technology. Much of this oil cannot be moved by conventional means (Immobile) or is mobile but has been bypassed by current production methods.

To address this substantial and inviting energy target, the FY 1989 budget proposal contains an initiative to broaden the department's ongoing Enhanced Oil Recovery (EOR) Program. Several EOR research efforts have been reoriented toward shorter-term objectives, reflecting the current inability of the petroleum industry to finance this type of research on its own. New program elements have been added, some of which will be initiated in the remaining months of FY 1988. Included will be an effort to characterize a broad spectrum of the nation's oil reservoirs to gain a better, quantitative understanding of their "anatomy" -- their structures, geometries, compositions and how they respond to fluid injection. Also included will be selected field tests, environmental research, and exploratory efforts in oil mining and new concepts such as microbial-based recovery techniques. A strong geoscience component will be included along with other fundamental chemical, physical and thermodynamic studies.

The enhanced oil recovery initiative emerged from months of discussions with oil company officials, academic researchers, trade associations and state agencies. We believe we have crafted a program that represents a consensus approach recommended by these private and public sector experts. The budgetary result of this new emphasis in petroleum recovery is that the department's FY 1989 request for EOR is higher than any comparable request since FY 1982, as shown by the funding chart below:





**Unconventional Gas Recovery** -- The \$1.7 million requested for research in the recovery of unconventional natural gas is sufficient to permit the department to assess the results of significant field tests and research efforts that have occurred in this program during the last five to six years, and to continue in-house, geoscience-oriented gas research. The recently completed Multiwell Experiment in the tight gas sand formations of Colorado has provided a wealth of new information which is now being documented. A directionally drilled, horizontal borehole test in an Eastern gas shale deposit in West Virginia has similarly generated substantial information that must be assessed before further research directions are determined. Within the geoscience focus of the proposed FY 1989 unconventional gas program, research will continue in gas hydrates and other long-range gas resources.

**Cooperative R&D Ventures** -- The FY 1989 proposal for a cooperative R&D venture program is an outgrowth of a concerted effort to obtain the private sector's advice and opinion. In contrast to previous proposals in this area, the FY 1989 initiative reflects greater consideration of funding priorities and on program goals and funding requirements in future years.

The FY 1989 proposal envisions the start of a two-phase program. The first phase would build on experiences gained from a pilot cooperative venture activity supported by Congress in FY 1988 (\$1 million). It would require \$9.0 million in FY 1989 funding and a total of \$27 million over an estimated four year period. Highest priority in this initial phase would be given to ventures that would increase the effective domestic resource base for moderately-priced liquid and gaseous fuels. If funds remain available, additional projects would be selected that could increase the contribution of coal by improving its environmental, technical and economic performance in industrial and commercial applications now dominated by oil and gas. A second phase of cooperative R&D ventures would be added beginning in FY 1990 requiring additional funding.

As in previous DOE budget requests for cooperative R&D venture funding, the program would enable the department to join private sector sponsors in the formation of joint ventures that address precompetitive stages of fossil energy technology development. Also consistent with previous proposals, the non-federal venture partners would contribute more than 50 percent of the venture funding. The cooperative ventures would be structured in such a way as to return to the U.S. Treasury the federal contributions if a venture ultimately leads to successful application of the R&D products.

The following pages describe the individual elements of the FY 1989 Fossil Energy budget request.



# INNOVATIVE CLEAN COAL TECHNOLOGY PROGRAM

<b>FUNDING ACTIVITIES</b>	(Dollars in Millions) (Parenthesis indicate Round #1)			% Change from FY 1988
	<b>FY 1987</b>	<b>FY 1988</b>	<b>FY 1989</b>	
Cooperative Agreements (Non-Add)	(\$145.3)	(\$145.3)	0.0	(-100.0%)
(New BA)	0.0	\$31.1	\$504.6	+ 1,522.2%
Program Direction				
(Non-Add)	(\$2.0)	(\$2.0)	0.0	(-100.0%)
(New BA)	0.0	18.5	14.0	-24.3%
Small Business Innovation Research (Non-Add)	(1.8)	(1.8)		
(New BA)		0.4	6.4	
<b>Total (Non-Add)</b>	<b>(\$149.1)</b>	<b>(\$149.1)</b>	<b>(0.0)</b>	
<b>Total (New BA)</b>	<b>0.0</b>	<b>50.0*</b>	<b>\$525.0</b>	<b>+ 950.0%</b>

\* Total Appropriation for FY 1988 is \$199.1 M.

## Background

- The goal of the CCT Program is, as stated in Pub. L. 99-190, "for the purposes of conducting cost-shared clean coal technology projects for the construction and operation of facilities to demonstrate the feasibility of future commercial operation." The Administration proposes to expand the existing program to support the Joint Envoys recommendations on the demonstration of innovative control technologies (i.e., the ICCT Program) over a five year period.
- The FY 1988 budget request included the initial increment of President's March 1987 commitment to requested \$2.5 billion in federal funding over a five-year period for innovative control technology demonstration to be matched at least with 50 percent cost sharing by project sponsors.
- Specifically, an additional \$50 million was appropriated in FY 1988 and \$525 million for FY 1989.
- The remaining \$1.775 billion is requested as an advanced appropriation in FY 1989 to be used for subsequent solicitations with \$575 million becoming available in FY 1990, \$600 million in FY 1991 and \$600 million in FY 1992.
- The next solicitations, including the one issued February 22, 1988, will provide financial assistance awards for projects that employ technologies capable of retrofitting or repowering existing facilities.

<b>FY 1989 BUDGET (AS APPROPRIATED IN FY 1988)</b>	<b>Dollars in Millions</b>
• <b>CCT-1 Cooperative Agreements (Round #1)</b>	
Complete construction on many projects and initiate or continue operational test program for several development efforts utilizing prior year funding. (FY 1988 - \$147.1M)	\$ 0.0
• <b>ICCT Cooperative Agreements (Round #2)</b>	
Complete negotiations and initiate projects resulting from the new solicitation for financial assistance that will focus on retrofit or repowering projects. (FY 1988 - \$31.5M)	504.6
• <b>Proposed funding for Small Business Innovation Research (FY 1988 - \$2.2M)</b>	6.4



**FY 1989 Budget (con'd)****Dollars In  
Millions****• Program Direction**

- Continue support of operational test program projects in first CCT solicitation using prior year funding. (FY 1988 - \$5.8M) 0.0
- Continue efforts to prepare necessary evaluations, status reports, presentations, etc. as may be required to describe the expanded program and its progress to accomplishing the existing as well as added objectives. Continue project technology, market assessments required to evaluate and direct the greater number of projects selected to demonstrate innovative control technologies. Continue analysis of project data and results to ensure consistency with intent of Special Envoy's Report and program objectives. (FY 1988 - \$6.0M) 5.9
- Continue environmental assessment studies and operational monitoring programs for projects selected in the initial CCT solicitation using prior year funds. Continue expanded environmental evaluation and data acquisition program required to implement NEPA requirements for each of the increased number of projects as well as the expanded program. (FY 1988 - \$4.8M) 3.9
- Provide salaries, benefits, travel expenses, etc. for 58 FTEs (FY 1988 - \$4.0M) 4.2

**Total FY 1989**

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**\$525.0**



## COAL R&D

### CONTROL TECHNOLOGY & COAL PREPARATION

(Dollars in Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Advanced Research	\$ 1.1	\$ 2.0	\$ 1.8	-10.0%
Coal Preparation	11.0	15.8	9.9	-37.3%
Flue Gas Cleanup	12.9	14.5	13.0	-10.3%
Gas Stream Cleanup	13.1	9.9	5.4	-45.4%
Waste Management	<u>0.9</u>	<u>1.4</u>	<u>1.4</u>	<u>0.0%</u>
<b>Total</b>	<b>\$39.0</b>	<b>\$43.6</b>	<b>\$31.5</b>	<b>-27.8%</b>

### Background

- Advanced Research, generic and fundamental in nature, is conducted on processes used to separate constituents such as ash, sulfur and nitrogen oxides in coal fuel streams before, during and after combustion.
- **Coal Preparation** is directed toward the development of advanced coal cleaning technologies that will reduce the ash and sulfur content of U.S. coal so that the product can be formulated into a high quality fuel that could replace oil and/or gas and reduce environmental emissions of suspected acid rain precursors from coal-fired boilers in both new and retrofit applications. Research is conducted in three broad areas: (1) physical treatment and cleaning; (2) chemical/biological pretreatment and cleaning; and (3) engineering support and ancillary operations.
- **Flue Gas Cleanup** addresses the removal of pollution causing contaminants from fossil fuel fired systems to meet current and projected environmental standards that could serve to limit the utilization of fossil fuels. Efforts will be focused on research and development of processes for the removal of NO<sub>x</sub>, SO<sub>x</sub>, and particulates, both for utility and industrial applications.
- **Gas Stream Cleanup** includes the technology for removal of contaminants from gasifier and combustor process streams prior to utilization in coal conversion systems. Both hardware and environmental protection are key concerns. Applications include PFB combustors, integrated gasifier combined cycle turbines, direct coal-fired turbines, coal-fueled diesels and fuel cells.
- **Waste Management** focuses primarily on waste sampling and characterization from coal preparation and emerging technology wastes.

### FY 1989 BUDGET REQUEST

**Dollars In  
Millions**

- **Advanced Research**

Continue fundamental research on processes used to separate constituents in coal-based fuel streams. \$ 1.8

Continue program management support. (FY 1988 - \$2.0M)
- **Coal Preparation**

Continue research and explore new concepts for physical and chemical/biochemical coal cleaning. Continue research on new technologies for controlling emissions from pre-NSPS utility boilers. (FY 1988 - \$6.3M) 4.9



**FY 1989 BUDGET (cont'd)****Dollars in  
Millions****• Coal Preparation (cont'd)**

- Continue DOE/EPRI testing of most promising advanced concepts for fine coal cleaning. (FY 1988 - \$2.2M) 2.1
- Continue in-house research on advanced physical and chemical coal cleaning concepts. Continue organic sulfur chemistry. Characterize feed coal and coal cleaning products, and study the role of surface functional groups in coal treatment. Continue program management support. (FY 1988 - \$2.6M) 2.9
- Completed or discontinued activities: low rank coal beneficiation, Gravimelt project, and coal cleaning research at SIU and Ames Lab (FY 1988 - \$4.65M) 0.0

**• Flue Gas Cleanup**

- Complete research on TUNG scrubbing process. Participate in EPRI high sulfur coal test facility. Continue spray dryer and in-duct technology development and systems integration studies for low cost duct injection. (FY 1988 - \$3.3M) 2.9
- Continue research on advanced NO<sub>x</sub>/SO<sub>2</sub> chemistry and systems modeling. Conduct economic assessments for scaleup. (FY 1988 - \$3.2M) 2.9
- Continue advanced NO<sub>x</sub> control research. (FY 1988 - \$0.3M) 1.2
- Complete fluidized bed copper oxide proof-of-concept evaluation. Continue moving bed process evaluation. (FY 1988 - \$1.5M) 2.2
- Continue research on most promising advanced flue gas processes for removal of SO<sub>2</sub> and NO<sub>x</sub> at larger scale. (FY 1988 - \$1.9M) 2.0
- Continue research on fine particulate control in coal-fired boilers. Initiate larger scale tests of fine particulate control technology. (FY 1988 - \$0.8M) 1.0
- Continue research on enhanced mass transfer for duct injection. (FY 1988 - \$0.5M) 0.5
- Continue technical and program management support. (FY 1988 - \$0.3M) 0.3
- Completed or discontinued projects: research on dry sorbent SO<sub>x</sub> control, advanced separation technology, Gio-Klen boiler tests, and NO<sub>x</sub>/SO<sub>x</sub> spray dryer. (FY 1988 - \$1.4M) 0.0

**• Gas Stream Cleanup**

- For Pressurized Fluidized-Bed Combustion, complete long-term test of ceramic cross flow filter. (FY 1988 - \$0.2M) 0.3
- For Integrated Gasification Combined Cycle, complete subpilot scale evaluations for cross flow filter and construction of desulfurization tailgas recycle to fixed-bed gasifier test facility; continue testing sulfur control devices at bench scale and development of novel sorbents and novel reactors. (FY 1988 - \$4.3M) 3.0
- For Direct Coal-Fired Turbines, continue subpilot scale testing of acoustic agglomeration and development of integrated low emissions concepts. (FY 1988 - \$2.3M) 1.8
- Continue systems analysis and program management support (FY 1988 - \$2.4M) 0.3
- Completed or discontinued projects: MCFC tolerance assessment (FY 1988 - \$0.6M) 0.0



- **Waste Management**

Continue sampling and characterization of organics and metals in solid wastes, and multi-site field monitoring of disposed wastes. Complete waste management systems analysis. (FY 1988 - \$1.0M)	1.2
Continue characterization of wastes, waste-related data base maintenance, and program management support. (FY 1988 - \$0.2M)	0.2
<b>Total FY 1989</b>	<b>\$31.5</b>

## ADVANCED RESEARCH AND TECHNOLOGY DEVELOPMENT

FUNDING ACTIVITIES	(Dollars in Millions)			% Change from FY 1988
	FY 1987	FY 1988	FY 1989	
Coal Utilization Science	\$ 4.9	\$ 4.5	\$ 3.1	-31.1%
Materials and Components:				
Materials	6.8	6.5	5.1	-21.5%
Components	<u>1.7</u>	<u>2.0</u>	<u>1.5</u>	<u>-25.0%</u>
Subtotal, Materials and Components	\$ 8.5	\$ 8.5	\$ 6.6	-22.3%
Technology Crosscut:				
Environmental Activities	2.2	2.4	2.6	+ 8.3%
Technical and Economic Analyses	2.0	1.5	2.6	+ 73.3%
Technology Base Synthesis	1.8	0.0	0.0	
International Program Support	0.0	0.0	0.7	
Instrumentation and Diagnostics	1.7	1.5	1.3	-13.3%
Bioprocessing of Coal	<u>0.0</u>	<u>1.0</u>	<u>0.2</u>	<u>-80.0%</u>
Subtotal, Technology Crosscut	\$ 7.7	\$ 6.4	\$ 7.4	+ 15.6%
University/National Laboratory Coal Research:				
University Coal Research	5.5	5.5	3.9	-29.0%
University/National Laboratory Cooperative Program	<u>0.0</u>	<u>0.0</u>	<u>0.4</u>	
Subtotal, University/National Cooperative Program	<u>\$ 5.5</u>	<u>\$ 5.5</u>	<u>\$ 4.3</u>	<u>-21.8%</u>
<b>Total, Advanced Research and Technology Development</b>	<b>\$26.6</b>	<b>\$24.9</b>	<b>\$21.4</b>	<b>-14.1%</b>

### Background

- The Advanced Research and Technology Development (AR&TD) Program is directed toward the scientific and technical areas that underlie the development of all fossil energy technologies.
- The AR&TD coal utilization science program focuses on mission-oriented fundamental research to increase understanding of the mechanisms of direct coal utilization.



## Background (con'd)

- The AR&TD Program includes generic studies of materials and components and investigations of instrumentation concepts in environments associated with advanced coal technologies.
- The AR&TD Program undertakes feasibility investigation and exploratory research of novel concepts in coal conversion and utilization.
- The AR&TD Program differs from the Fossil Energy line programs; the latter have an end-item technology development orientation while AR&TD's mission is to pursue generic research in support of all Fossil Energy coal line programs. It addresses fundamental scientific and engineering problems that are barriers to Fossil Energy technological goals. The AR&TD program is unique in that it is directed to specific scientific and technical areas which are closely connected to long-range Fossil Energy objectives.
- Part of Direct Utilization funding was transferred to Advanced Research within Control Technology and Coal Preparation, Combustion Systems and Fuel Cells to comply with FY 1988 Congressional direction.

## FY 1989 BUDGET REQUEST

**Dollars in  
Millions**

### • Coal Utilization Science

- Continue, at a reduced level, investigations of the formation, transformation and characterization of fuel and combustion product species; coal devolatilization, pyrolysis and volatile char oxidation; and radiant heat transfer. Continue, at a reduced level, studies specific to low-rank coal. Includes in-house research performed by METC and PETC. Continue to fund technical and program management support. (FY 1988 \$4.5M) \$ 3.1

### • Materials

- Continue research on advanced steam cycle alloys, mechanisms of erosion and corrosion, ceramics composites, and advanced aluminides. Continue development of superconducting oxides. Continue to fund technical and management support. (FY 1988 - \$6.5M) 5.1

### • Components

- Continue efforts initiated in FY87 for controllable letdown and alternate flow concepts. Initiate low pressure turbine flow control, nozzle development, and fluidic fuel injection for diesels and unique flow control concepts. (FY 1988 \$0.5M) 0.6
- Continue fundamental research on solids transport. Continue to fund technical and program management support. (FY 1988 - \$1.5M) 0.9

### • Environmental Activities

- Continue analyses of issues associated with air and water quality, solid waste disposal, and toxic substances. Continue support of occupational health, quality assurance, and safety compliances services. (FY 1988 - \$1.7M) 1.9



FY 1989 BUDGET (Cont'd)	Dollars In Millions
• <b>Environmental Activities (cont'd)</b>	
- Continue research conducted under NAPAP with emphasis on quality assurance of data and analytical tools. (FY 1988 - \$0.7M)	0.7
• <b>Technical &amp; Economic Analyses</b>	
- Continue generic studies supporting multi-year planning, FE strategy and program formulation; conduct contract studies that crosscut a number of FE programs, fund IEA/Coal Research Service activities. Continue coal technology export and linkage studies, planning, and evaluation. (FY 1988 - \$1.5M)	2.6
• <b>International Program Support</b>	
- Conduct analyses, studies and technical evaluations of the IEA and bilateral agreement activities in which the FE program is involved. (FY 1988 - \$0.0M)	0.3
- Support international collaborative research activities in Fossil Energy. (FY 1988 - \$0.0M)	0.4
• <b>Instrumentation and Diagnostics</b>	
- Continue investigation of fiber optic sensor combustion probes and spectroscopic hot gas stream analysis techniques. Continue to fund technical and program management support. (FY 1988 - \$1.5M)	1.3
• <b>Bioprocessing of Coal</b>	
- Continue, at a reduced level of effort, fundamental research in the bioprocessing of coal to gain an improved understanding of the reactions occurring when coal is desulfurized or converted to gases or liquids by biological means. Continue program and management support. (FY 1988 - \$1.0M)	0.2
• <b>University Coal Research</b>	
- Support approximately 22 new grants at universities on the ongoing research topics including coal science, reaction chemistry, surface science, advanced process concepts, thermodynamics, engineering fundamentals, and environmental sciences; continue encouragement of collaboration between university and industrial researchers. (FY 1988 - \$5.5M)	3.9
- Initiate one joint project involving collaboration of a national laboratory with universities in an area such as enzyme incorporated membrane processes, superconductivity applications in catalysis and beneficiation, supercomputers for molecule design, and laser-induced chemistry. Continue to fund technical and program management support. (FY 1988 - \$0.0M)	0.4
<b>Total FY 1989</b>	<b>\$21.4</b>



## COAL LIQUEFACTION

(Dollars in Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Advanced Research	\$ 4.5	\$ 6.1	\$ 3.2	-47.5%
Direct Liquefaction	11.9	13.4	3.2	-76.1%
Indirect Liquefaction	6.2	6.6	2.8	-57.6%
Support Studies/Engineering Evaluation	<u>1.4</u>	<u>1.0</u>	<u>1.1</u>	<u>+10.0%</u>
<b>Total</b>	<b>\$24.0</b>	<b>\$27.1</b>	<b>\$10.3</b>	<b>-62.4%</b>

### Background

- This program supports basic and applied research to develop advanced technology for the production of synthetic liquid fuels from coal. The Department focuses upon several approaches to produce liquid fuels from coal: direct liquefaction, indirect liquefaction and novel approaches.

FY 1989 BUDGET REQUEST	<u>Dollars In Millions</u>
• <b>Advanced Research</b>	
Continue research on: novel catalytic, biological and other approaches to coal liquefaction; improving the understanding of liquefaction processes; and, on physical, chemical and thermodynamic properties of fossil fuel liquids. (FY 1988 - \$6.1M)	\$ 3.2
• <b>Indirect Liquefaction</b>	
Continue laboratory research at PETC investigating catalysts/reactor systems to efficiently convert coal derived gaseous feedstocks to gasoline, diesel, or jet fuels. Maintain limited laboratory research with industry and universities on alcohol and hydrocarbon fuel process concepts. (FY 1988 - \$6.6M)	2.8
• <b>Direct Liquefaction</b>	
Continue PETC in-house research. Maintain limited bench scale industrial research in coprocessing and/or staged catalytic liquefaction. (FY 1988 - \$5.4M)	3.2
Completed or discontinued projects: Wilsonville Liquefaction Facility (FY 1988 - \$8M)	0.0
• <b>Support Studies/Engineering Evaluations</b>	
Continue to develop solvent quality characterization and process evaluation information on advanced coal liquefaction processes. Continue novel catalyst development and process studies at Sandia National Lab. (FY 1988 - \$1.0M)	1.1
<b>Total FY 1989</b>	<u><b>\$10.3</b></u>



## COMBUSTION SYSTEMS

FUNDING ACTIVITIES	(Dollars in Millions)			% Change from FY 1988
	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	
Advanced Research	\$ 3.3	\$ 3.4	\$ 2.1	-38.2%
Atmospheric Fluidized Bed Combustion	3.3	2.4	1.7	-20.6%
Pressurized Fluidized Bed Combustion	5.8	7.2	7.1	-1.4%
Advanced Combustion Technology	2.8	3.5	2.7	-22.9%
Alternative Fuels Utilization	3.2	3.7	3.8	+2.7%
Limestone Injection Multistage Burners	<u>0.0</u>	<u>5.0</u>	<u>0.0</u>	<u>-100.0%</u>
<b>Total</b>	<b>\$18.4</b>	<b>\$25.2</b>	<b>\$17.4</b>	<b>-31.0%</b>

### Background

- The Department of Energy has developed a program to increase the contribution and application of the nation's coal resources through the development of acceptable combustion systems and fossil-derived fuels for the marketplace.
- The programs within the overall Combustion Systems activity are: Advanced Research, Atmospheric Fluidized Bed (AFB), Pressurized Fluidized Bed (PFB), Alternative Fuels and Advanced Combustion Technology. Funding for the Limestone Injection Multistage Burner (LIMB) program, conducted by EPA is also part of this activity.

### FY 1989 BUDGET REQUEST

Dollars In  
Millions

- **Advanced Research**

- Continue studies to examine the fundamental aspects of combustion mechanisms, corrosive behavior and deposition of combustion products. (FY 1988 - \$3.4M) \$ 2.1

- **Atmospheric Fluidized Bed Combustion**

- Continue to conduct experimental and analytical erosion studies and AFBC development. (FY 1988 - \$0.6M) 0.6
  - Complete bench scale testing for one advanced concept for AFBC. (FY 1988 - \$0.9M) 0.5
  - Complete subsystem development testing for one concept within the Special Applications Program. (FY 1988 - \$0.9M) 0.6

- **Pressurized Fluidized Bed Combustion**

- Continue evaluation of PFB components, design alterations and changes in operating parameters to improve systems reliability, reduce costs and enhance environmental performance. (FY 1988 - \$0.5M) 0.7



FY 1989 BUDGET (cont'd)	Dollars In Millions
Continue modeling studies to predict tube erosion/corrosion and linking criteria. Continue to determine mechanisms for tube wastage alloys for long term testing. Provide technical and program management support. (FY 1988 - \$0.5M)	0.7
Continue R&D at Morgantown Energy Technology Center on PFB economics, systems analyses, and combustion characterization. Continue technology and economic analysis assessments. Evaluate the use of "nonconventional" sorbents in advance PFB systems. (FY 1988 - \$1.9M)	1.7
Continue Advanced Concepts Phase II development and maintain project schedule and scope by testing key critical process components such as the circulating bed required to confirm proof-of-concept. (FY 1988 - \$3.6M)	4.0
Completed or discontinued projects: Grimethorpe follow-on efforts (FY 1988 - \$0.5M)	0.0
<b>• Advanced Combustion Technology</b>	
Continue the base program for the development of the most promising advanced combustion systems for retrofit, light industrial, commercial and large residential applications. (FY 1988 - \$2.7M)	2.0
Continue in-house activities including combustion and system characterization of coal based fuels. This activity also includes data base development for technology transfer to the private sector. Provide technical and program management support. (FY 1988 - \$0.8M)	0.7
<b>• Alternative Fuels Utilization</b>	
Continue identification, formulation and characterization of coal-based fuels in support of the advanced combustion systems program. This activity includes transport, handling and storage studies, and combustion characterization of beneficiated coal based fuels. Continue project management support and international cooperative research. Assess and test deeply beneficiated coals for retrofitting large pre-NSPS coal-fired boilers for acid rain control. Provide technical and program management support. (FY 1988 - \$3.7M)	3.8
<b>• Limestone Injection Multistage Burners</b>	
No activity. (FY 1988 - \$5.0)	0.0
<b>Total FY 1989</b>	<b>\$17.4</b>



## FUEL CELLS

(Dollars in Millions)

FUNDING ACTIVITIES	FY 1987	FY 1988	FY 1989	% Change from FY 1988
Advanced Research	\$ 1.3	\$ 1.5	\$ 1.0	-33.3%
Phosphoric Acid Systems	15.5	13.2	0.0	-100.0%
Molten Carbonate Systems	7.6	11.1	3.5	-68.5%
Advanced Concepts	5.0	8.4	2.2	-73.8%
<b>Total</b>	<b>\$29.4</b>	<b>\$34.2</b>	<b>\$ 6.7</b>	<b>-80.4%</b>

### Background

- The objective of the Fuel Cells program is to support high risk, high payoff technology base development and to assist private industry in developing hydrocarbon fuel conversion technologies to increase the cost effective, efficient and environmentally acceptable use of conventional and alternative hydrocarbon fuels.
- Advanced research, fundamental and generic in nature, is conducted to better understand the basis of the underlying processes involved in fuel cell operation and to explore novel concepts.
- Phosphoric acid systems have reached a near-commercial technical status with large scale testing underway. The Department proposes that any further technology development should be the responsibility of the private sector.
- The technical feasibility of molten carbonate fuel cells operating at approximately 60 percent electrical conversion efficiency (natural gas to busbar) has been forecasted by single cell testing. The complexity and associated capital costs of advanced fuel cell systems are projected to be less than those for first generation phosphoric acid fuel cell systems.
- The solid oxide fuel cell is an advanced, high temperature solid state fuel cell that offers promise in electric utility and in cogeneration applications in industrial and commercial sectors.

### FY 1989 BUDGET REQUEST

Dollars in  
Millions

#### • Advanced Research

Continue generic research in basic electrochemistry science (FY 1988 - \$1.5M) \$ 1.0

#### • Molten Carbonate Systems

Continue development of three coal-fueled molten carbonate fuel cell (MCFC) stack technologies and initiate action to select competitively the most promising MCFC technology. (FY 1988 - \$10.3M) 3.3

Continue technology base research, coal gasification/MCFC system study, and program management support. (FY 1988 - \$0.8M) 0.2

#### • Advanced Concepts

Continue development of solid oxide fuel cell (SOFC) technology for a multi-kW generator. (FY 1988 - \$6.9M) 1.6



**FY 1989 BUDGET (con'd)**Dollars in  
Millions• **Advanced Concepts (cont'd)**

Continue evaluation of advanced concepts. Conduct coal gasification/SOFC system analysis and materials characterization and development. Continue program management support. (FY 1988 - \$1.5M)

0.6

**Total FY 1989****\$ 6.7****HEAT ENGINES**

(Dollars in Millions)

<b>FUNDING ACTIVITIES</b>	<b><u>FY 1987</u></b>	<b><u>FY 1988</u></b>	<b><u>FY 1989</u></b>	<b><u>% Change from FY 1988</u></b>
Gas Turbines	\$ 9.0	\$11.0	\$ 6.8	-38.2%
Diesel Engines	<u>3.1</u>	<u>7.0</u>	<u>2.2</u>	<u>-68.6%</u>
<b>Total</b>	<b>\$12.1</b>	<b>\$18.0</b>	<b>\$ 9.0</b>	<b>-50.0%</b>

**Background**

- The principal goal of this program is to establish technical data which will enable the private sector to assess the commercial viability of coal-fueled power conversion systems. The program focuses on key technical problems associated with substituting coal or coal-derived gaseous fuels for distillate fuels or natural gas in gas turbine and diesel power conversion systems.
- Applications for this technology include Industrial cogeneration, combined cycle electric power generation, repowering of existing generating capacity, and both rail and marine transportation.
- The FY 1989 budget request for Heat Engines is believed to be appropriate given the need to reduce the Federal budget deficit. Because of fiscal constraints, it is not appropriate or necessary to fund multiple approaches in this program area.

**FY 1989 BUDGET REQUEST**Dollars in  
Millions• **Gas Turbines**

Continue coal-fueled gas turbine integrated systems testing with two contractors. (FY 1988 - \$10.2M)

\$ 5.8

Evaluate coal-based liquids in METC pressurized combustor test stand and test gas cleanup device in METC gas turbine combustor. Continue program management support. (FY 1988 - \$0.8M)

1.0

• **Diesel Engines**

Continue coal-fueled diesel engine integrated system tests with one contractor. Test novel injection combustion and wear from coal-water mixtures and new fuel forms in METC diesel engine test facility and investigate advanced diesel cycles in METC diesel rig. Continue program management support. (FY 1988 - \$7.0M)

2.2

**Total FY 1989****\$ 9.0**



## UNDERGROUND COAL GASIFICATION

(Dollars in Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Gasification Technology Development	\$ 1.2	\$ 1.7	\$ 0.0	-100.0%
Environmental and Advanced Research	<u>1.2</u>	<u>1.1</u>	<u>0.3</u>	<u>-72.7%</u>
<b>Total</b>	<b>\$ 2.4</b>	<b>\$ 2.8</b>	<b>\$ 0.3</b>	<b>-89.3%</b>

### Background

- This program represents viable technologies for in situ conversion of coal to a cleaner burning, easily transportable gaseous fuel.
- Program is directed toward the definition of sufficient technical operational, and environmental parameters to allow industry to make decisions concerning the commercial development of the technology.

FY 1989 BUDGET REQUEST	<u>Dollars In Millions</u>
Continue environmental compliance, restoration, and reclamation activities at historical UCG test sites as required by law. (FY 1988 - \$2.8)	\$ 0.3

## MAGNETOHYDRODYNAMICS (MHD)

(Dollars in Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Proof-of-Concept Topping Cycle	\$16.3	\$21.4	\$ 0.0	-100%
Proof-of-Concept Bottoming Cycle	7.1	8.6	0.0	-100%
Proof-of-Concept Seed Regeneration	0.2	0.9	0.0	-100%
Systems Studies, Supporting Research and Conceptual Design	<u>2.9</u>	<u>4.1</u>	<u>0.0</u>	<u>-100%</u>
<b>Total</b>	<b>\$26.5</b>	<b>\$35.0</b>	<b>\$ 0.0</b>	<b>-100%</b>

### Background

- The FY 1988 MHD program began the design, fabrication and testing of "proof of concept" systems in accordance with the June 1984 cost-shared multiyear program. Long duration "proof of concept" testing is needed for the advancement of the MHD technology to the retrofit demonstration stage. A retrofit demonstration stage is needed for the determination of subsequent commercial application.

FY 1989 BUDGET REQUEST	<u>Dollars In Millions</u>
No funds are requested for FY 1989. Since an estimated \$172 million (in constant FY 1988 dollars) will be needed over the next five years to complete the "proof of concept" program, DOE believes the MHD program is not affordable in light of fiscal constraints, particularly considering other emerging options. (FY 1988 - \$35.0M)	\$ 0.0



## SURFACE COAL GASIFICATION

(Dollars in Millions)

FUNDING ACTIVITIES	FY 1987	FY 1988	FY 1989	% Change from FY 1988
Advanced Research	\$ 2.8	\$ 2.7	\$ 0.7	-74.1%
Systems for Power Production	14.4	11.2	0.9	-92.0%
Systems for Industrial Fuel Gas Production	1.2	1.4	0.8	-42.9%
Systems for Synthesis Gas Production	1.8	1.9	1.3	-31.6%
Systems for Coproducts Production	4.1	5.3	0.8	-84.9%
Great Plains Coal Gasification Project	0.4	0.5	0.5	0.0%
<b>Total</b>	<b>\$24.7</b>	<b>\$23.0</b>	<b>\$ 5.0</b>	<b>-78.3%</b>

### Background

- The coal gasification program is organized to foster the development of advanced gasifier systems for the production of: electric power, synthesis gas (for synthetic natural gas, indirect liquefaction, and chemical feedstocks), industrial fuel gas, and coproducts (simultaneous production of solids, liquids, and gases). This activity also provides for basic and fundamental research related to Surface Coal Gasification processes including studies of reaction mechanisms and chemistry. Finally, this program supports the continued management and monitoring of the Great Plains Project.

### FY 1989 BUDGET

Dollars In  
Millions

- **Advanced Research**

- Complete work on the biological conversion of coal to methane. Complete work on the mechanisms of ash agglomeration in fluidized bed gasifiers. (FY 1988 - \$2.2M) \$ 0.6
- Complete work on separating hydrogen from synthesized gas using ion exchange membranes. Complete work on the factors controlling cleavage and restoration of bonds. Complete work on study of active carbon site distribution. (FY 1988 - \$0.5M) 0.1

- **Systems for Power Production**

- Continue studies on entrained flow reactors to reduce process severity and increase efficiency of gasification. (FY 1988 - \$0.5M) 0.4
- Continue environmental sampling and analysis to characterize process and effluent streams. Provide technical and program management support. (FY 1988 - \$0.2M) 0.1
- Continue development and testing of hot desulfurization in entrained flow reactor system for power generation. (FY 1988 - \$2.8M) 0.4
- Completed or discontinued activities: GE project for application of hot gas desulfurization to integrated gasifier combined cycle systems and Waltz Mill pressurized fluidized bed gasifier with hot gas clean-up (FY 1988 - \$6.9M) 0.0



**FY 1989 BUDGET (Cont'd)****Dollars In  
Millions****• Systems for Industrial Fuel Gas Production**

- Continue development of economical methods for oxygen production for use in multi-ton/day plants. (FY 1988 - \$0.4M) 0.2
- Continue operation of the fluidized bed reactor at METC as well as continuing support for the planning implementation, and application of the gasification data base. Provide technical and program management support. (FY 1988 - \$0.6M) 0.6
- Completed or discontinued activities: hydrogen production from low-rank coal and waste water treatment studies (FY88 - \$0.8M) 0.0

**• Systems for Synthesis Gas Production**

- Continue engineering and technical support for the joint DOE/GRI program. (FY 1988 - \$0.4M) 0.6
- Continue development of a novel concept for the separation of hydrogen from coal derived gas. (FY 1988 - \$0.1M) 0.2
- Continue systems analysis and model development efforts. Provide technical and program management support. (FY 1988 - \$0.2M) 0.5

**• Systems for Coproducts Production**

- Conduct comparative slow and rapid heating rate experiments to establish a matrix of product yields and to investigate product options for coal-based fuels from mild gasification. (FY 1988 - \$0.3M) 0.7
- Continue modeling analysis and system analysis. Provide technical and program management support. (FY 1988 - \$0.2M) 0.1
- Completed or discontinued activities: research for high Btu defense fuels (FY88 - \$0.5M) 0.0

**• Great Plains Coal Gasification Project**

- Conduct environmental compliance activities. Complete post operations assessments and information archiving. Provide administrative closeout expenses. (FY 1988 - \$0.5M) 0.5

**Total FY 1989****\$ 5.0**



# PETROLEUM

## ADVANCED PROCESS TECHNOLOGY

(Dollars in Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Advanced Exploratory Research	\$ 3.3	\$ 3.0	\$ 1.7	-43%
Arctic and Offshore Research	<u>0.5</u>	<u>0.4</u>	<u>0.5</u>	<u>+25%</u>
<b>Total</b>	<b>\$ 3.8</b>	<b>\$ 3.4</b>	<b>\$ 2.2</b>	<b>-35%</b>

### Background

- The Advanced Process Technology (APT) Program pursues new concepts to achieve major increases in efficiency and cost reduction of recovery techniques for oil, gas, and oil shale. Research goals are:
  - to conduct fundamental research relevant to recovery of oil, gas and shale oil.
  - to pursue application of new concepts which may achieve major increases in the recovery of oil, gas and shale oil resources.
  - to develop a fossil energy-related knowledge base that will improve the economics of fossil fuel production in the Alaskan Arctic and expand the reserves.

### FY 1989 BUDGET REQUEST

**Dollars In  
Millions**

#### • Advanced Exploratory Research

- Continue a program of fundamental studies including cross-cutting research in petroleum chemistry focusing on structural characterization and determination of a structure-property relationship of heavy crudes, intermediate process streams, products, and byproducts. (FY 1988 - \$0.8M) \$ 0.6
- Continue, at a reduced level, research on geoscience and extraction technology and development of advanced instrumentation to measure reservoir characteristics and thermal fronts. (\$2.0M) 1.0
- Continue, at a reduced level, research on pollutants in aquifers adjacent to oil, gas, and shale in-situ recovery operations. 0.1  
Continue funding for technical and program management support. (FY 1988 - \$0.2M)

#### • Arctic and Offshore Research

- Continue generation and acquisition of research data on ice island motions and ice flow interactions with structures; continue Arctic/Offshore oil and gas research and information identification. Continue funding for technical and program management support. (FY 1988 - \$0.5M) 0.5

**Total FY 1989**

**\$ 2.2**



## ENHANCED OIL RECOVERY

(Dollars In Millions)

FUNDING ACTIVITIES	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>% Change from FY 1988</u>
Heavy Oil	\$ 2.4	\$ 3.7	\$ 4.0	+ 8.1%
Light Oil	7.2	9.9	13.0	+ 31.3%
Tar Sands	1.6	2.0	0.0	-100.0%
Pilot Venture Program	<u>0.0</u>	<u>1.0</u>	<u>0.0</u>	<u>-100.0%</u>
<b>Total Enhanced Oil Recovery</b>	<b>\$11.2</b>	<b>\$16.6</b>	<b>\$17.0</b>	<b>+ 2.4%</b>

### Background

- Enhanced oil recovery represents a technology that can fill the gap between now and the critical time when the nation will likely rely more extensively on synthetic fuels (also being developed by our Oil Shale, Tar Sands, and Liquefaction programs).
- The Department of Energy has developed a program to conduct generic technology base R&D activities; develop fundamental knowledge that can lead to improved and new process concepts; and to assist industry in obtaining a better understanding of the mechanisms and behavior of advanced and novel EOR processes for the recovery of presently unrecoverable light oil, heavy oil and tar sand resources.
- FY 1989 funding will concentrate upon heavy and light oil recovery research. Developing advanced oil recovery techniques is a major initiative of the Fossil Energy R&D program for FY 1989.

### FY 1989 BUDGET REQUEST

Dollars In  
Millions

- **Heavy Oil**
  - Continue basic research in mobility control mechanisms of steamflood additives. Define the mechanisms by which foam increases oil recovery and develop analytical and numerical models. Develop relative permeability and capillary pressure data. (FY 1988 - \$0.4M) \$ 1.5
  - Continue cooperative research with Venezuela on petroleum characterization and recovery studies and expand technical and analytical assessments related to geoscience and reservoir characterization. (FY 1988 - \$0.2M) 0.5
  - Continue a geoscience characterization program, research in novel extraction approaches to presently deemed unrecoverable, heavy oil resources, and fundamental studies of reservoir characteristics and injection fluid interactions. Provide technical and program management support. (FY 1988 - \$1.5M) 2.0
- **Light Oil**
  - Continue a broad based program of research in light oil recovery techniques for reservoir description and conduct related planning, technical and analytical assessments. (FY 1988 - \$3.6M) 4.2
  - Continue a geoscience effort and reservoir characterization and related fundamental studies addressing definition of reservoir structure and composition. (FY 1988 - \$2.5M) 3.7



<b>FY 1989 BUDGET (cont'd)</b>		<b>Dollars In Millions</b>
<b>• Light Oil (cont'd)</b>		
Continue microbiological studies and explore the feasibility of other novel methods of extraction of residual oil resources. (FY 1988 - \$1.0)		1.1
Continue a research program that utilizes CO <sub>2</sub> and other gas recovery methods in a variety of situations to study and identify displacement mechanisms requisite to efficient, effective and predictable application of these techniques. (FY 1988 - \$0.6)		1.8
Continue industry/state cooperative work to rapidly demonstrate lab scale EOR concepts in mature fields. Develop retrofit technology to reduce stripper well costs. Provide technical and program management support. (FY 1988 - \$1.9)		2.2
<b>Total FY 1989</b>		<b>\$17.0</b>

## OIL SHALE

<b>FUNDING ACTIVITIES</b>	<b>(Dollars in Millions)</b>			<b>% Change from FY 1988</b>
	<b>FY 1987</b>	<b>FY 1988</b>	<b>FY 1989</b>	
Oil Shale Technology Base	\$ 7.7	\$6.7	\$0.7	-89.6%
Environmental Mitigation	3.2	2.8	0.3	-89.3%
<b>Total Oil Shale</b>	<b>\$10.9</b>	<b>\$9.5</b>	<b>\$1.0</b>	<b>-89.5%</b>

## Background

- Oil shale technology development represents the development of extraction and conversion processes designed to convert oil shale to a state of liquid fuels.
- The Department of Energy has developed a program to provide a sound technological basis for reduction of economic and environmental constraints to industrial development of the U.S. oil shale resources and to increase the amount of resources that may be used economically. The program will focus on basic research using reference shales to systematically study the chemistry, kinetics, and emissions related to eastern and western shale processing.

<b>FY 1989 BUDGET REQUEST</b>	<b>Dollars In Millions</b>
<b>• Oil Shale Technology Base</b>	
Continue experiments with reference shales in various generic fast heat-up lab-scale retorts, with mechanistic modeling support. Continue developing a systems analysis capability as well as continuing development and maintenance of an oil shale data base. Provide technical and program management support. (FY 1988 - \$2.8M)	\$ 0.7



**FY 1989 BUDGET (cont'd)**

**Dollars In  
Millions**

• **Environmental Mitigation**

Continue analytical methods development, studies of mechanisms of pollutant generation and fate, process stream characterization, and development of an environmental data base. Conduct planning, technical, and analytical assessments. Provide technical and program management support. (FY 1988 - \$0.3M) 0.3

**Total FY 1989**

**\$ 1.0**

**GAS**

**UNCONVENTIONAL GAS RECOVERY**

(Dollars in Millions)

<b>FUNDING ACTIVITIES</b>	<b><u>FY 1987</u></b>	<b><u>FY 1988</u></b>	<b><u>FY 1989</u></b>	<b>% Change from <u>FY 1988</u></b>
Eastern Gas Shales	\$0.9	\$ 2.3	\$ 0.3	-87.0%
Western Tight Gas Sands	5.4	3.3	0.3	-90.9%
Environmental and Advanced Research	<u>1.7</u>	<u>4.9</u>	<u>1.1</u>	<u>-77.6%</u>
<b>Total Unconventional Gas Recovery</b>	<b>\$8.0</b>	<b>\$10.5</b>	<b>\$ 1.7</b>	<b>-83.8%</b>

**Background**

- This program fosters the development of advanced technologies for the extraction of natural gas from currently unrecoverable gas resources by reducing the uncertainty surrounding the potential magnitude of reserves of the unconventional gas resources and the conditions under which they will be produced. The program will develop technologies to the point where concepts are proven and economics established.

**FY 1989 BUDGET REQUEST**

**Dollars In  
Millions**

• **Eastern Gas Shales**

Continue in-house support to maintain and update the technical data base and research with associated reservoir and stimulation models; continue systems analysis in support of production strategy development. (FY 1988 - \$2.3M) \$ 0.3

• **Western Tight Gas Sands**

Continue in-house support to update predictive reservoir and stimulation models; expand technical data base. Continue systems analysis in support of production strategies and also forecasts of regional production patterns in light of multi-well results and reservoir heterogeneity. (FY 1988 - \$3.3M) 0.3



**FY 1989 BUDGET (cont'd)**

**Dollars In  
Millions**

**• Environmental and Advanced Research**

Continue in-house geologic, geophysical and geochemical studies in support of a program to explore deep source gas generation potential of organics subducted due to plate tectonic convergence. (FY 1988 - \$0.2)	0.3
Continue research to explore, on a fundamental basis, geophysical and geochemical properties of gas hydrates and to examine gas hydrate recovery strategies based on an understanding of the gas release mechanisms. Conduct in-house technology assessment of processes to convert natural gas to liquids. Provide technical and program management support. (FY 1988 - \$4.6)	0.8
<b>Total FY 1989</b>	<b>\$ 1.7</b>

**COOPERATIVE R&D VENTURES**

FUNDING ACTIVITIES	(Dollars in Millions)			% Change from FY 1988
	FY 1987	FY 1988	FY 1989	
Cooperative R&D Ventures	\$0.0	\$0.0	\$9.0	n/a

**Background**

- The Administration proposes to initiate a multiyear two-phase program for cooperative research and development ventures in fossil energy technologies.
- The first phase would provide immediate support to those ventures which are currently ready to proceed, and would require approximately \$27 million over an estimated four-year period.
- The design of the first phase could be based, in part, on experiences obtained from the pilot cooperative R&D venture activity considered under the Enhanced Oil Recovery program.
- The second phase, in which awards would be made in FY 1990, would support a subsequent set of ventures which will be defined and organized by potential participants in the intervening period. Additional funds beginning in FY 1990 would be required for this second phase.
- The FY 1989 budget request proposes \$9,000,000 to enable the Department to join with private sector participants in the formation of cooperative research and development ventures which address precompetitive stages of fossil energy technology development, and in which the non-federal venture partners contribute over 50 percent of the venture funding.



# **FY 1989 BUDGET REQUEST**

**Dollars In  
Millions**

- Cooperative R&D Ventures**

Provide financial assistance awards for cost-shared cooperative R&D ventures that can ease the level of future oil imports by focusing on the development of technologies that satisfy mission objectives to increase the effective domestic resource base for moderately-priced liquid and gaseous fuels; and to increase the contribution of coal by improvements in environmental, technical and economic performance in industrial and large commercial applications currently dominated by oil and gas. Under the Phase I program, higher priority would be given to the first of the above two areas. (FY 1988 - \$0) \$8.9

Provide support for preparing and issuing Phase I solicitation and Phase II Statements of Interest. Monitor activities, and assist parties interested in establishing potential ventures. (FY 1988 - \$0) 0.1

**Total FY 1989**

**\$9.0**

## **PROGRAM MANAGEMENT & CAPITAL EQUIPMENT**

### **PROGRAM DIRECTION & MANAGEMENT SUPPORT**

<b>FUNDING ACTIVITIES</b>	<b>(Dollars in Millions)</b>			<b>% Change from FY 1988</b>
	<b>FY 1987</b>	<b>FY 1988</b>	<b>FY 1989</b>	
Headquarters Program Direction				
Salaries and Benefits	\$ 8.0	\$ 9.1	\$ 8.4	-7.6%
Travel	0.6	0.5	0.3	-40.0%
Contract Services	<u>3.0</u>	<u>4.4</u>	<u>1.0</u>	<u>-77.2%</u>
Subtotal, Headquarters Program Direction	\$11.6	\$14.0	\$ 9.7	-30.7%
ETC Program Direction				
Salaries and Benefits	\$17.5	\$19.0	\$13.5	-28.9%
Travel	1.0	1.0	0.6	-40.0%
Contract Services	<u>28.5</u>	<u>27.8</u>	<u>11.0</u>	<u>-60.4%</u>
Subtotal, ETC Program Direction	\$47.0	\$47.8	\$25.1	-47.4%
Federal Inspector for the Alaskan Natural Gas Transportation System	<u>\$ 0.2</u>	<u>\$ 0.2</u>	<u>\$ 0.2</u>	<u>0.0%</u>
<b>Total Program Direction</b>	<b>\$58.8</b>	<b>\$62.1</b>	<b>\$35.0</b>	<b>-43.6%</b>

### **Background**

- This activity provides funding for salaries, benefits and overhead expenses for the management of FE programs at Headquarters and the Energy Technology Centers:



## Background (cont'd)

- The Headquarters staff is responsible for overall program direction which implements DOE policy and communicates that policy to the Energy Technology Centers, sets program objectives, develops program plans and evaluates alternative program strategies, develops and defends budget requests to the Office of Management and Budget and to the Congress, approves procurement plans, monitors work progress, evaluates projects, approves revisions in work plans as required to attain program goals, and supports the new Office of Geoscience Research.
- The Energy Technology Centers support day-to-day project management functions for assigned programmatic areas including contract and National Laboratory monitoring, development and maintenance of project budget, procurement plans, and other activities related to program and site support.
- The Office of the Federal Inspector for the Alaska Natural Gas Transportation System is responsible for coordinating all Federal activities pertaining to the pipeline in order to assure timely, efficient, safe, and environmentally sound construction, including the assessment of developments in the world energy market, specifically the U.S. and Canadian oil and gas situation as they affect the Alaska Natural Gas Transportation System.

## FY 1989 BUDGET REQUEST

Dollars in  
Millions

### • Headquarters Program Direction

- Provide funds for salaries and benefits of 125 full time-equivalent (FTE) personnel at Headquarters. This staff implements and communicates policy to the ETC's, sets program objectives, develops program plans and evaluates alternative strategies; develops and defends budget requests; approves procurement plans, monitors work programs. (FY 1988 - \$9.1M) \$ 8.4
- Provide funds for travel of 125 FTEs in support of the activities stated above. Both domestic and international travel is conducted. (FY 1988 - \$0.5M) 0.3
- Provide for contractual services that are generic to the entire FE program. Included are items such as printing, computer services, technical support services, conferences, etc. (FY 1988 - \$4.4M) 1.0

### • ETC Program Direction

- Provide funds for salaries and benefits of the ETC staff of 243 FTEs. Activities of the staff include contract and lab monitoring; development and maintenance of project, budget and procurement plans, and other activities related to program and site support. (FY 1988 - \$19.0M) 13.5
- Provide funds for travel of 243 FTEs in support of the coordination of the above activities in the attainment of program goals, both on the domestic front and abroad. (FY 1988 - \$1.0M) 0.6



**FY 1989 BUDGET (cont'd)**

Dollars In  
Millions

<ul style="list-style-type: none"> <li>Provide funds for facility operations, maintenance, finance and administrative support and other costs not appropriately chargeable to R&amp;D projects, in support of this level of FTE's. (FY 1988 - \$27.8M)</li> </ul>	11.0
<ul style="list-style-type: none"> <li><b>Federal Inspector for the Alaskan Natural Gas Transportation System</b> <ul style="list-style-type: none"> <li>Provide funds for administrative and support functions; continue to assess developments in U.S. and Canadian energy markets and maintain liaison with project sponsors, producers, other government agencies, State of Alaska and Canadian government. (FY 1988 - \$0.2M)</li> </ul> </li> </ul>	0.2
<b>Total FY 1989</b>	<b>\$35.0</b>

**PLANT AND CAPITAL EQUIPMENT**

(Dollars in Millions)

<b>FUNDING ACTIVITIES</b>	<b>FY 1987</b>	<b>FY 1988</b>	<b>FY 1989</b>	<b>% Change from FY 1988</b>
Capital Equipment	\$ 1.6	\$ 0.5	\$ 0.0	-100.0%
Construction	1.8	17.7	0.5	-97.1%
<b>Total Plant and Capital Equipment</b>	<b>\$ 3.4</b>	<b>\$18.2</b>	<b>\$ 0.5</b>	<b>-97.3%</b>

**Background**

- Capital equipment is purchased annually to replace obsolete equipment so that the Energy Technology Centers (ETCs) and the National Laboratories analytical capabilities are constantly being upgraded.
- General plant projects are essential to the safe, efficient operation of the ETCs and construction is dedicated to a number of improvements, alterations and additions at each of the ETCs.

**FY 1989 BUDGET**

Dollars In  
Millions

<ul style="list-style-type: none"> <li><b>Capital Equipment</b> <ul style="list-style-type: none"> <li>No Activity. (FY 1988 - \$0.5M)</li> </ul> </li> </ul>	\$ 0.0
<ul style="list-style-type: none"> <li><b>Construction</b> <ul style="list-style-type: none"> <li>Continue design of chemical engineering laboratories project at PETC. (FY 1988 - \$0)</li> </ul> </li> </ul>	0.5
<b>Total FY 1989</b>	<b>\$ 0.5</b>



**STATEMENT BY J. ALLEN WAMPLER OF MARCH 2, 1988**

**TESTIMONY BEFORE THE  
SUBCOMMITTEE ON ENERGY RESEARCH AND  
DEVELOPMENT  
COMMITTEE ON SCIENCE, SPACE AND  
TECHNOLOGY  
U.S. HOUSE OF REPRESENTATIVES**



**OPENING STATEMENT**

**OF**

**J. ALLEN WAMPLER**

**ASSISTANT SECRETARY FOR FOSSIL ENERGY**

**U.S. DEPARTMENT OF ENERGY**

**MARCH 2, 1988**



MADAM CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE.

IT IS AGAIN A PLEASURE TO BEGIN THE FY 1989 BUDGET REVIEW PROCESS BY APPEARING BEFORE THIS SUBCOMMITTEE. I HAVE WITH ME, AT THE TABLE, MR. DONALD BAUER, MY PRINCIPAL DEPUTY, AND MR. JEREMIAH WALSH, THE DEPUTY ASSISTANT SECRETARY FOR MANAGEMENT. THERE ARE OTHER KEY STAFF MEMBERS PRESENT THAT, WITH THE SUBCOMMITTEE'S PERMISSION, I MAY ASK TO ASSIST ME IN ANSWERING SOME OF YOUR MORE DETAILED QUESTIONS.

I ALSO APPRECIATE THE SUBCOMMITTEE'S CONSIDERATION BY INCLUDING MY FORMAL STATEMENT IN THE RECORD AND PERMITTING ME TO SUMMARIZE ITS KEY POINTS.

THE BUDGET WE HAVE SUBMITTED TO YOU IS ONE WE BELIEVE IS NECESSARILY AGGRESSIVE IN THOSE AREAS WHERE A MORE NEAR-TERM EMPHASIS IS WARRANTED -- SUCH AS IN THE DEMONSTRATION OF CLEAN COAL TECHNOLOGIES AS THE CENTERPIECE OF THE ADMINISTRATION'S RESPONSE TO CONCERNS OVER ACID RAIN, AND IN THE AREA OF ENHANCED OIL RECOVERY WHERE WE HAVE UNDERTAKEN SEVERAL NEW INITIATIVES AND HAVE PROPOSED AN FY89 LEVEL THAT IS SIGNIFICANTLY LARGER THAN PREVIOUS REQUESTS.



OUR PROPOSED BUDGET IS ALSO TECHNICALLY SOUND. IT EMPHASIZES THOSE AREAS WHERE WE CONTINUE TO BUILD A SOLID BASE OF SCIENTIFIC AND TECHNICAL EXPERTISE -- IN AREAS SUCH AS COAL, OIL AND GAS-RELATED RESEARCH AND DEVELOPMENT.

AND EQUALLY IMPORTANT, MADAM CHAIRMAN, IT IS AN AFFORDABLE BUDGET. THE ITEMS CONTAINED IN OUR REQUEST HAVE BEEN BALANCED AGAINST A HOST OF PRESSING -- AND OFTEN COMPETING -- PRIORITIES. ADMITTEDLY, THERE IS A WEALTH OF PROJECT IDEAS AND CONCEPTS THAT COULD BE LEGITIMATE AND WORTHWHILE CANDIDATES FOR FEDERAL FUNDING. WE HAVE SUBJECTED THESE IDEAS AND CONCEPTS TO A RIGOROUS SCREENING PROCESS -- FIRST AT THE ASSISTANT SECRETARY LEVEL, THEN AT THE SECRETARIAL LEVEL, AND ULTIMATELY, AT THE ADMINISTRATION LEVEL.

THOSE THAT HAVE EMERGED -- AND WHICH ARE CONTAINED IN THIS BUDGET PROPOSAL -- REPRESENT THOSE THAT WE BELIEVE ARE OF HIGHEST PRIORITY TO THE CONTINUED ADVANCE OF FOSSIL FUEL TECHNOLOGY. THEY ARE THE PROGRAMS AND PROJECTS WE BELIEVE WILL HELP MOVE THE TECHNOLOGY OF COAL, OIL AND GAS INTO THE 21ST CENTURY.



AS I HAVE OUTLINED IN MY FORMAL STATEMENT, OUR BUDGET REQUEST IS MADE UP OF TWO MAJOR COMPONENTS -- THE CLEAN COAL TECHNOLOGY INITIATIVE, AND THE FOSSIL ENERGY RESEARCH AND DEVELOPMENT PROGRAM. THE TWO ARE COMPLEMENTARY BUT HAVE DISTINCTLY DIFFERENT ORIENTATIONS.

AS THE SUBCOMMITTEE IS AWARE, THE CLEAN COAL PROGRAM IS INTENDED TO PROVIDE FEDERAL MATCHING FUNDS TO DEMONSTRATE THE COMMERCIAL VIABILITY OF A NEW GENERATION OF ENVIRONMENTALLY IMPROVED, HIGH EFFICIENCY COAL TECHNOLOGIES.

THE OUTCOME OF THIS PROGRAM WILL BE A NEW SUITE OF COAL COMBUSTION AND POLLUTION CONTROL FACILITIES THAT WILL BE UNMATCHED BY ANY NATION IN THE WORLD -- EACH PROJECT PROVIDING THE PERFORMANCE DATA AND OPERATIONAL EXPERIENCE NECESSARY FOR THE PRIVATE SECTOR TO MAKE FUTURE DEPLOYMENT DECISIONS.

THE CLEAN COAL PROGRAM IS NOW WELL UNDERWAY. IT IS AN EFFORT IN WHICH BOTH THE CONGRESS AND THE ADMINISTRATION CAN TAKE JUSTIFIABLE PRIDE. THE PRESIDENT'S INITIATIVE INCORPORATES A PORTION OF, AND BUILDS ONTO, AN ONGOING \$400 MILLION EFFORT APPROVED BY CONGRESS IN FY 1986.



THE BUDGET FOR THIS PROGRAM IN FY 1988 AND 1989 IS \$575 MILLION -- AN AMOUNT THAT REFLECTS LAST YEAR'S CONGRESSIONAL APPROVAL OF THE FIRST INCREMENT OF THE PRESIDENT'S \$2.5 BILLION, 5-YEAR INITIATIVE.

AS THE CHART ON PAGE ONE OF MY FORMAL STATEMENT SHOWS, \$536 MILLION OF THESE FUNDS HAVE BEEN MADE AVAILABLE FOR PROJECT FINANCING. ON FEBRUARY 22, THE DEPARTMENT ISSUED ITS SECOND SOLICITATION FOR CLEAN COAL TECHNOLOGY PROJECTS. PROPOSALS ARE DUE ON MAY 23, AND WE EXPECT TO SELECT PROJECTS BY LATE SUMMER.

A SECOND ASPECT OF OUR CLEAN COAL BUDGET PROPOSAL IS OUR REQUEST FOR ADVANCE APPROPRIATIONS FOR THE REMAINING \$1.78 BILLION TO COMPLETE THE PRESIDENT'S INITIATIVE. AS THE SUBCOMMITTEE IS AWARE, THE AMOUNT APPROVED BY CONGRESS LAST YEAR FELL SHORT OF THE PRESIDENT'S REQUEST FOR THE FIRST TWO YEARS OF THE EXPANDED CLEAN COAL PROGRAM.

WE REMAIN COMMITTED TO THE FULL SCOPE OF THE CLEAN COAL PROGRAM, AND CONSEQUENTLY, WE ARE REQUESTING THAT CONGRESS RESTORE FULL FUNDING FOR THE PROGRAM BY APPROPRIATING, IN ADVANCE, \$575 MILLION FOR FY 1990, \$600 MILLION FOR FY 1991 AND \$600 MILLION FOR FY 1992.



ADVANCE APPROPRIATIONS ARE IMPORTANT FOR TWO PRINCIPAL REASONS:

ONE, IT IS IMPORTANT FOR THE U.S. TO DEMONSTRATE ITS COMMITMENT TO THE FULL IMPLEMENTATION OF THE SPECIAL ENVOYS' REPORT ON ACID RAIN. THIS IS NECESSARY BOTH IN OUR INTERNATIONAL RELATIONS AND IN ASSURING DOMESTIC FIRMS THAT THE GOVERNMENT IS PREPARED TO STAND BEHIND ITS COMMITMENT TO COST-SHARING.

SECOND, IT IS IMPORTANT FROM AN R&D PERSPECTIVE. SEVERAL PROMISING CLEAN COAL CONCEPTS ARE NOW IN THE R&D PIPELINE. MANY ARE NOT SUFFICIENTLY MATURE TO COMPETE FOR CLEAN COAL FUNDS TODAY BUT THEY COULD BE CONSIDERED AS CANDIDATES WITHIN THE NEXT TWO TO THREE YEARS. FOR THEIR DEVELOPMENT TO CONTINUE TODAY -- WITH AS MUCH PRIVATE FINANCING AS POSSIBLE -- SPONSORS NEED TO HAVE CONFIDENCE THAT THE FEDERAL COMMITMENT AND THE NECESSARY COST-SHARING FUNDS WILL BE AVAILABLE TO TAKE THE FINAL STEP AT THE END OF THEIR DEVELOPMENT PHASE. FUNDING FOR THE CLEAN COAL PROGRAM, THEREFORE, SERVES AS A STIMULUS FOR CONTINUED PRIVATE R&D TODAY.

THE CLEAN COAL PROGRAM IS CERTAINLY ONE OF THE MOST VISIBLE PARTS OF OUR FOSSIL ENERGY PROGRAM, BUT IT SHOULD NOT OVERSHADOW THE SECOND COMPONENT OF OUR BUDGET -- THE CORE R&D EFFORT.



THE \$168 MILLION WE ARE PROPOSING FOR COAL, OIL AND NATURAL GAS RESEARCH AND DEVELOPMENT IS A 53 PERCENT REDUCTION FROM THE AMOUNT APPROPRIATED IN FY 1988. BUT IN MANY WAYS, MADAM CHAIRMAN, THAT NUMBER IS MISLEADING. FULLY ONE HALF OF THE PROPOSED REDUCTION CAN BE ATTRIBUTED TO THE PHASE OUT OF FOUR PROJECTS THAT HAVE ACHIEVED THEIR OBJECTIVES -- THESE ARE THE WILSONVILLE AND LAPORTE LIQUEFACTION PROJECTS, THE WALTZ MILL GASIFIER FACILITY, AND THE PHOSPHORIC ACID FUEL CELL PROGRAM -- AND OUR RECOMMENDATION TO CEASE FUNDING FOR THE MHD PROGRAM.

IN THE CASE OF THE COMPLETED PROJECTS, THESE ARE EFFORTS THAT HAVE RETURNED IMPORTANT DIVIDENDS IN TERMS OF NEW KNOWLEDGE AND INFORMATION. BUT THEY HAVE ACHIEVED THEIR GOALS. THE DATA IS AVAILABLE TO THE PRIVATE SECTOR. WITH OTHER PRESSING PRIORITIES, IT IS DIFFICULT TO JUSTIFY THEIR CONTINUED FUNDING.

THE MHD PROGRAM IS SOMEWHAT DIFFERENT. HERE, THE QUESTION IS ONE OF AFFORDABILITY. AS WE ATTEMPT TO GAIN MAXIMUM BENEFIT FROM A LIMITED NUMBER OF DOLLARS, IT IS UNREASONABLE, IN OUR OPINION, TO ALLOCATE \$1 OUT OF EVERY 10 TO A SINGLE, VERY LONG RANGE CONCEPT. MOREOVER, AS MY FORMAL STATEMENT INDICATES, THE MHD PROGRAM WILL LIKELY COST AS MUCH AS \$172 MILLION TO PROVE THE TECHNICAL CONCEPT WITHIN THE NEXT FIVE YEARS. WE BELIEVE THESE FUNDS COULD BE BETTER SPENT.



INSTEAD OF CONCENTRATING ON THE REDUCTION IN FUNDING, I THINK IT IS IMPORTANT TO ALSO LOOK AT OUR 1989 BUDGET REQUEST IN CONTEXT WITH OUR REQUEST OF LAST YEAR. BY THIS COMPARISON, OUR BUDGET WOULD INCREASE BY \$17 MILLION. SIX OF NINE MAJOR CATEGORIES IN THE COAL PROGRAM WOULD INCREASE IN FUNDING. THE ENHANCED OIL RECOVERY PROGRAM WOULD INCREASE BY MORE THAN 75 PERCENT. WE HAVE SUBSTANTIALLY BOOSTED OUR REQUEST FOR GEOSCIENCES RESEARCH.

IN OTHER WORDS, MADAM CHAIRMAN, WE HAVE ARRIVED AT A BUDGET RECOMMENDATION THAT STRENGTHENS THOSE AREAS THAT NEEDED STRENGTHENING AND DEEMPHASIZES THOSE AREAS WHERE GOALS HAVE BEEN ACHIEVED AND TARGETS MET.

I HOPE THAT, IN OUR DISCUSSION THIS MORNING, WE CAN PRESENT A CONVINCING CASE THAT THIS BUDGET IS TECHNICALLY PRUDENT AND FISCALLY SOUND. WE HOPE TO SHOW THAT WE HAVE DONE OUR HOMEWORK IN AREAS SUCH AS COOPERATIVE R&D VENTURES, WHERE WE HAVE REFINED OUR PROPOSAL BASED LARGELY ON THE INPUT FROM PUBLIC MEETINGS AND FROM CONGRESSIONAL GUIDANCE. WE HOPE TO DEMONSTRATE THAT OUR BUDGET REPRESENTS A BALANCED EFFORT, WITH EMPHASIS GIVEN NOT ONLY TO COAL, BUT TO OIL AND GAS. AND WE HOPE TO SHOW THAT THIS BUDGET WILL BE EFFECTIVE IN CONTINUING THE SIGNIFICANT ADVANCES THAT HAVE BEEN MADE IN FOSSIL ENERGY TECHNOLOGY IN THE LAST SEVERAL YEARS.



THAT COMPLETES MY OPENING SUMMARY. I WILL BE PLEASED TO  
ANSWER ANY QUESTIONS THE SUBCOMMITTEE MAY HAVE.

THANK YOU.



**SPEECH BY JACK S. SIEGEL OF FEBRUARY 18, 1988**

**"IMPLEMENTATION OF THE PRESIDENT'S  
INNOVATIVE CLEAN COAL TECHNOLOGY  
PROGRAM: A STATUS REPORT"**

**15TH ENERGY TECHNOLOGY CONFERENCE**

**WASHINGTON, DC**



REMARKS OF

JACK S. SIEGEL  
DEPUTY ASSISTANT SECRETARY FOR COAL TECHNOLOGY  
OFFICE OF FOSSIL ENERGY  
U.S. DEPARTMENT OF ENERGY

TO THE

15TH ENERGY TECHNOLOGY CONFERENCE

FEBRUARY 18, 1988

WASHINGTON HILTON HOTEL  
WASHINGTON, D.C.



primary purpose of this research program is to demonstrate the kinds of technologies that would be needed for any future acid rain control program, it should also result in some near-term reductions in U.S. air emissions that affect Canadian ecosystems.

Furthermore, special consideration should be given to technologies that can be applied to facilities currently dependent on the use of high-sulfur coal. .... The commercial demonstration of innovative technologies that clean high-sulfur coal will help to reduce the economic consequences of any future acid rain control program (by substituting for coal-switching).

In accordance with the President's March 18, 1987, innovative clean coal technology initiative, the DOE is prepared to carry out a program that:

- o Is consistent with the Special Envoys Report on Acid Rain;
- o Provides necessary financial assistance in the form of cost-sharing with industry for innovative projects that are in the national interest while ensuring against undue subsidies;
- o Is conducted within a timeframe consistent with expected utility decisionmaking and/or the revision of national policy regarding environmental emission standards; and



- o Offers regulatory incentives that allow new clean coal technologies to be considered in utility and other market-driven decisionmaking.

### Definitions of Retrofit and Repowering Technologies

Innovative clean coal technologies can generally be grouped into two categories: retrofit technologies and repowering technologies.

Retrofit technologies can be used to modify existing facilities to reduce air emissions that cause acid rain. Examples of these technologies are advanced coal cleaning, limestone injection multistage burner, slagging combustors, gas reburning, induct sorbent injection, coal-water mixtures, and advanced flue gas cleanup, which, used separately or in combination, are expected to reduce both SO<sub>2</sub> and NO<sub>x</sub> emissions. Although the sulfur emission reduction potentials of some of these technologies may be lower than conventional flue gas scrubbing, the reduction levels will likely be sufficient to meet possible future requirements for existing plants.

Repowering technologies can be used to replace all or a significant portion of an original facility and can achieve significant emissions reductions while often increasing capacity, extending the life of a plant, and improving the plant's efficiency. For example, repowering can involve the replacement of a portion of the power generating equipment, typically all or a portion of the worn-out boiler. The steam generation portion of the plant is retained and linked to the new power



equipment. Examples of repowering technologies are integrated gasification combined cycle and fluidized bed combustion, which are able to reduce both  $\text{SO}_2$  and  $\text{NO}_x$  emissions significantly.

#### Importance of Retrofit Technologies

The first category of ICCT technologies, retrofit technologies, will become more important if the nation ultimately chooses to impose more stringent requirements on existing, pre-New Source Performance Standards power facilities. In that case, the need to use today's conventional control options -- flue gas scrubbers, coal cleaning, and coal switching -- could result in significant problems, such as high costs for compliance, large quantities of scrubber sludge, coal miner dislocations, and possibly fuel switching from coal to gas or oil. However, if new regulations are established, there are some very promising retrofit technologies being developed as viable options.

The DOE, at this time, does not advocate tightening the standards for older coal-fired power facilities because the scientific evidence does not support a need for new emissions control regulations. The DOE's position is supported by The National Acid Precipitation Assessment Program, or NAPAP, interim assessment -- published in September 1987 -- which reported on the scientific data collected on the causes and effects of acid rain. One of the assessment's conclusions stated "there will not be abrupt changes in aquatic systems, crops, or forests at present levels of air pollution." In other words, the nation is not "standing at the edge of an environmental precipice." In fact,



the NAPAP assessment made a statement favorable to clean coal technologies:

"Implementation of emerging new technologies having the potential to achieve greater control of sulfur dioxide and nitrogen oxide emissions at lower cost could result in a decline in the emissions of these pollutants over the next half century. These technological advances ... may offset any potential emission increases from increased coal use."

#### Importance of Repowering Technologies and Repowering Report

The importance of the second category of ICCT technologies, repowering technologies, is emphasized in a recent DOE report, published in December 1987, entitled, "The Role of Repowering in America's Power Generation Future." The report analyzes the environmental benefits and potential increases in nationwide electricity generating capacity that could result from replacing older coal-fired plants with new clean coal technologies.

Until recently, the technical options available to utilities for dealing with aging boilers, meeting increasing demand for electricity, and complying with more demanding environmental requirements have been limited to three options: they could undertake a series of steps to extend the lives of the plants, add scrubbers, or build new



pulverized-coal-fired plants. But, with recent advances in coal technologies, a fourth option, repowering with clean coal technology, can be added to the list.

The repowering report examines three scenarios, projected to the year 2030, as shown in the Figure. The first scenario, "Base/50," is the business-as-usual case, with "50" denoting plant lifetimes of 50 years, which assumes that no acid rain law is passed and older plants are replaced with new plants that meet new source performance standards. The second scenario, "1.2 lb/50," is the acid rain control case, which assumes that Congress passes an acid rain law. The third scenario, "CCT," is the clean coal technology case. This case assumes that, in the 1995-2010 period, older, uncontrolled plants are repowered with gasification combined cycle and fluidized bed technologies. After 2010, the upper boundary assumes that new plants are an equal mix of new clean coal technologies and conventional pulverized-coal boilers equipped with scrubbers, and the lower boundary assumes the most optimistic case where only the gasification combined cycle technology is applied, achieving 99% reduction. Actual application of CCT is expected to result in a mix of technologies. All three scenarios assume that electricity demand grows at 2.5 percent each year.

These scenarios, plotted out over the next four decades, allow some interesting observations to be made. Under the acid rain control scenario, after 1990, the emissions would drop immediately, from 14 million tons per year down to six. As an aside, this is assuming there is enough scrubber manufacturing capability available to meet this rapid



demand -- and that may be doubtful. But, beginning in 1995, emissions would begin to rise, and by the year 2010, as the increase in power plant construction overtakes the limited abilities of conventional control technology, emissions would begin to rise sharply. By the year 2030, they would be at the 10 million tons per year level, which is exactly where the emissions level would be for the business-as-usual case. In the business-as-usual case, the decline in emissions would be more gradual, but the end point 40 years into the future would be the same.

In other words, under the acid rain control scenario, the year 2030 emissions would meet a level that would have been achieved even without an acid rain law; the nation would not have solved the sulfur emission problem, but merely deferred it as a legacy to future generations.

But the results are strikingly different for the clean coal technology scenario. The drop-off in emissions would begin later than in the acid rain scenario -- by about five to ten years. But, by the year 2005, the emissions reductions would be at the same level, and while the acid rain control plot would begin its upward path, the clean coal technology plot would continue downward, reaching three million tons per year by the year 2010 before leveling off.

The results of this brief comparison of the scenarios are consistent with the repowering report's conclusion that repowering aging coal-fired power plants with clean coal technologies could lead to deep, sustained reductions in  $\text{SO}_2$  and  $\text{NO}_x$  emissions while potentially meeting



much of the U.S.'s anticipated demand for new power capacity through the year 2010.

Again, quoting from the NAPAP assessment, "if the costs projected by the engineering analysis for new plants using the advanced technologies are correct, implementation of these technologies may proceed steadily based on economics alone." In other words, sizable emission reductions are a fringe benefit of market-driven choices.

#### Attractiveness of ICCT to Nation's Electric Utilities and 1990's Window of Opportunity

Developing the ICCT Program technologies that are capable of retrofitting and repowering the U.S. inventory of fossil fuel power plants offer major attractions to the nation's electric utilities.

It appears that the electric utilities industry stands today at the threshold of a fundamental change in this nation's power generation technological base, just as the ICCT Program is beginning to get underway -- fortuitously, just when it is most needed.

There is little doubt that electricity is vital to the future of the U.S. The nation's economic health and national security depend on continued economic growth, and if adequate electrical generating capacity is not available, the country runs the risk of this growth being undermined.



By the middle of the next decade, many utilities will be increasingly confronted by the dual problem of an aging boiler inventory and the potential long-term need for increasing their power generating capacity. More than half of all coal-fired boilers will be 25 years old or older by the mid-1990's. In the eastern U.S. alone, there are 410 units of coal-fired utility capacity that are 100 megawatts or larger. That is an aggregate generating capacity of 128 gigawatts. These units, placed in service from 1955 to 1975, do not have post-combustion SO<sub>2</sub> control devices. Together, they were responsible for nearly 10 million tons of sulfur emissions in 1980. Beginning in the mid-1990's, utility decision makers will have to make some fundamental choices about many of these units -- to retire them, refurbish them, repower them, or replace them.

In this same time frame, demand for electricity will be growing and reserve margins declining. Estimates for increasing power demand vary, typically between two- and three-percent, but even with the more conservative two-percent growth rate, the U.S. could require as much as 100,000 megawatts of additional new capacity by the end of this century -- that is, beyond what is under construction today.

But, utility decision makers have been understandably reluctant in recent years to invest in large, conventional baseload plants -- either coal or nuclear fueled. Uncertainty over anticipated growth in power demand, coupled with uncertainty regarding future environmental regulations, have stalled many construction projects.



Thus, the uncertainty in the anticipated future demand for new facilities, either to meet new demand or as a replacement for older units, plus today's slowdown in construction, have combined to create a "window of opportunity" for new clean coal technologies that will open even wider in the 1990's. Many of the innovative clean coal repowering and retrofit technologies are designed to generate electric power more efficiently and in a more environmentally beneficial manner than is possible using today's conventional technologies. If utilities are to have the performance data available in time to take advantage of the innovative clean coal repowering and retrofit options, commercial-scale demonstration facilities must be constructed and be in operation by the early 1990's.

#### Repowering Technologies and Electric Utilities

The repowering technologies are especially attractive options for those utilities that face the dual problem of aging baseload power plants and the need for additional electricity. For example, repowering a conventional steam-cycle plant with pressurized fluidized bed combined cycle technology can increase power output by 30 to 50 percent. Installing integrated gasification combined cycle technology as a replacement for the conventional boiler can boost output by as much as 150 percent. This increase in power output from an existing facility could defer the need to build a new increment of baseload facilities. The repowering technologies can be installed relatively quickly (compared to construction of a new baseload plant) and in a modular fashion. This would allow a utility to carry out its construction



program in small, less costly increments to meet projected demand growth. This will help ensure that consumers are not confronted with another cycle of "rate shock" caused by bringing large, new baseload plants into service.

A repowered plant would also be capable of reducing sulfur emissions by as much as 99 percent, at a cost per ton of  $\text{SO}_2$  removed that is much less compared to the cost per ton resulting from the addition of a scrubber. Nitrogen oxide emissions would also be lowered to well below present federal standards for new units.

Thus, with these repowering technologies, utilities can use much of the balance-of-plant equipment in aging plants, increase their outputs significantly, extend their useful lifetimes, and greatly reduce  $\text{SO}_2$  and  $\text{NO}_x$  emissions. A further advantage is that these technologies are relatively insensitive to coal type and can be installed on most existing coal-fired power plants.

#### Retrofit Technologies and Electric Utilities

As with the repowering technologies, an expanded slate of retrofit clean coal technologies would also provide attractive options to certain utilities -- those utilities confronted with possible increased requirements for emission controls. These retrofit technologies would provide substantially improved options that are preferable to those choices currently available, with their attendant disadvantages. As discussed earlier, if more stringent environmental controls were to be



imposed on existing coal-fired facilities, utilities would be limited to three options -- flue gas scrubbing which is very costly, switching to low-sulfur coals which could create severe socio-economic impacts, and conventional coal cleaning which has limited capability to reduce  $\text{SO}_2$  emissions.

These new retrofit technologies offer the flexibility to be used individually or in combination with one another to achieve emissions control of both  $\text{SO}_2$  and  $\text{NO}_x$ . They provide cost-effective options for the diverse inventory of coal-fired power plants, including those that are limited in available space. They permit the full range of coals to be used in small, moderate or large size boilers. And they produce waste products that are more easily and safely disposable, or, in some cases, saleable.

#### Potential Market for New Repowering and Retrofit Technologies

The ultimate value from the new repowering and retrofit technologies will be derived, of course, from their eventual commercial replication and use in the marketplace. And the potential market for these technologies is large. As mentioned earlier, in the eastern U.S. alone, there are 410 units of coal-fired utility capacity, of a size of 100 megawatts or larger, that will be 25 years old or older by the mid-1990's. That is an aggregate generating capacity of 128 gigawatts



made up of units that do not have post-combustion SO<sub>2</sub> control devices. So, beginning in the mid-1990's, the choices will be to retire them, retrofit them, repower them, or replace them.

Also, depending upon which technology is used, there would be a maximum potential for repowering of from 19 to 155 gigawatts of projected increased capacity between 1998 and the year 2010. The actual number will depend upon such factors as space availability, competing fuels, public utility commission decisions, and so on. But the potential is there for demonstrated innovative clean coal technologies.

#### International Marketing Advantages of New Clean Coal Technologies

Also, the availability of demonstrated clean coal technologies can give the country a substantial marketing advantage overseas. The ICCT Program may provide the single most important advantage the U.S. could have in the global market for new technologies and new energy supplies.

Worldwide consumption of coal is expected to increase by more than one-third between now and the end of the century, primarily because of increasing coal-fired electric generating capacity. For example, the International Energy Agency recently reported that the Organization for Economic Cooperation and Development, or OECD, coal use is forecast to increase from 820 million metric tonnes in 1985 to more than 1250 million tonnes by the year 2000, and that the OECD coal-fired electric generating capacity could grow from just over 500 gigawatts in 1985 to



670 gigawatts by the turn of the century. Close to half of the increase will occur outside the North American market.

As in the U.S., growth in demand for coal by many industrialized and developing nations will likely be accompanied by increasing concerns over environmental effects. The improved coal technologies being developed and demonstrated in the U.S. will be able to meet the environmental objectives of the international community.

Moreover, because our clean coal technology projects will provide commercial-scale performance data using U.S. coals, the potential exists to link U.S. coal exports and U.S. technology in a way that enhances America's competitiveness in both. The "packaging" of U.S. coal and the technology to use it cleanly and efficiently can become an important by-product of the Nation's clean coal technology program.

#### Summary -- Domestic and International Benefits of ICCT Program

In summary, the innovative clean coal technology program will address the environmental aspects of using coal, and, further, it will contribute to this nation's future energy security and economic vitality. The ICCT Program offers the potential to:

- o Control large amounts of the  $\text{SO}_2$  and  $\text{NO}_x$  released from coal-fired power plants.



- o Return economic benefits to American consumers by permitting clean energy to be generated without financially constraining capital investments for environmental controls.
- o Retrofit and repower aging coal-fired power plants, particularly those in the East.
- o Use high-sulfur coals, thereby avoiding the social disruptions associated with massive coal switching.
- o Greatly enhance U.S. technological leadership and international competitiveness.
- o Benefit both Eastern and Western states by making available more cost-effective, fuel-flexible power systems capable of using the full spectrum of U.S. coals.
- o Improve international trade by providing a more attractive, marketable "package" of both coal and the advanced technology to use it and by reducing the cost of energy-intensive U.S. goods.
- o Help ensure that the U.S. enters the twenty-first century with a broad array of sophisticated, cleaner, and more economical coal-based energy technologies, rather than being limited to the more costly, less effective environmental control options available today.



- o Enhance the long-term energy security of the U.S.

Schedule for the Upcoming ICCT Program Solicitation

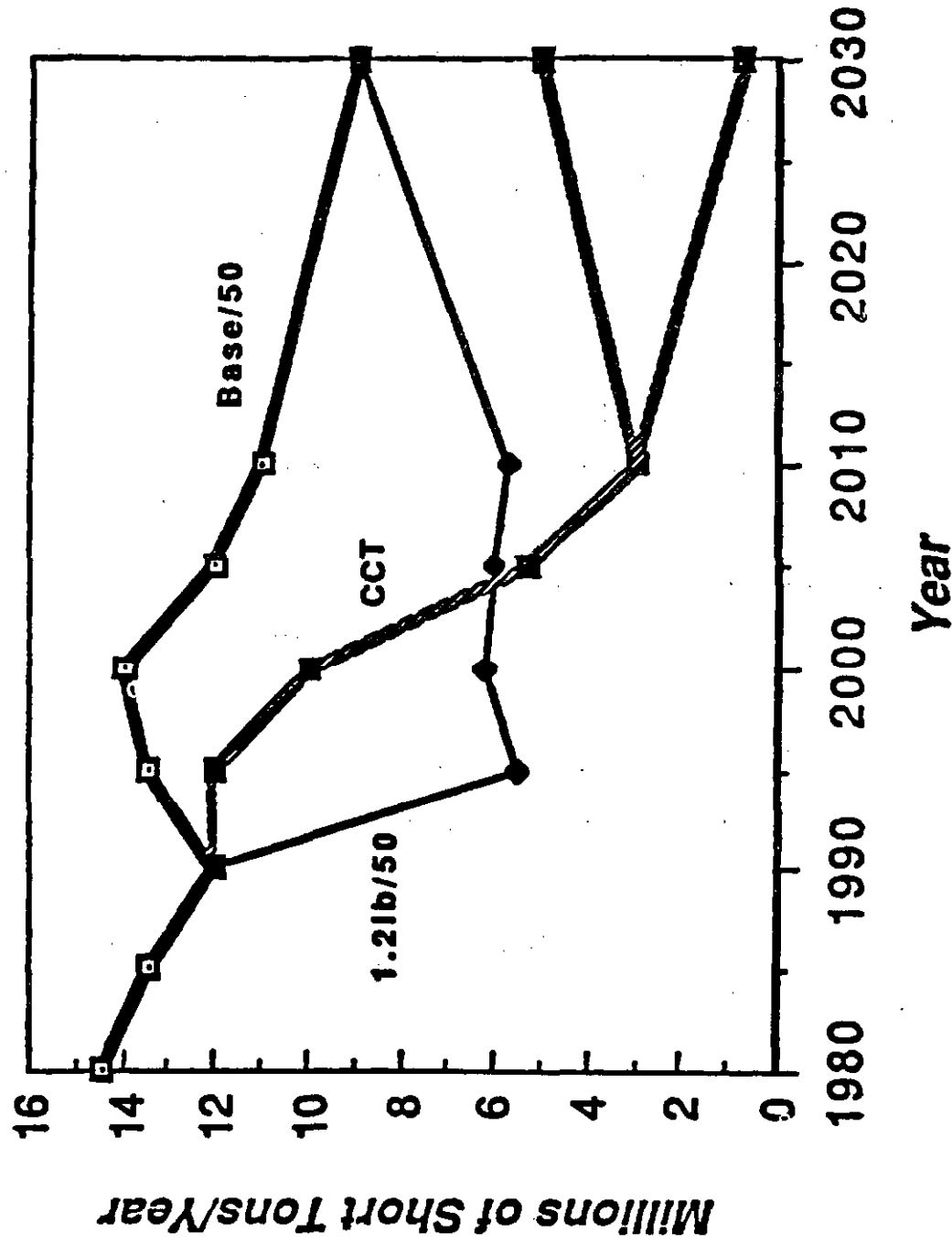
On December 22, 1987, the Congress appropriated \$575 million for an expanded Clean Coal Technology demonstration program -- \$50 million in Fiscal Year 1988 and an advance appropriation of \$525 million in Fiscal Year 1989. Pursuant to the schedule mandated by the Congress, the schedule for the ICCT Program solicitation is:

- o Final Program Opportunity Notice, or PON, issued to the public -- February 22, 1988. (No later than 60 days following enactment.)
- o Closing date for receipt of proposals -- May 23, 1988. (No later than 90 days after issuance of the PON.)
- o Projects selected -- no later than October 30, 1988. (No later than 160 days after receipt of proposals.)

The source evaluation board was established in December and is proceeding on schedule.



# Comparison of Projected SO<sub>2</sub> Emission Trends from Fossil-Fired Utility Boilers in the Eastern U.S. Conventional vs. Clean Coal Technologies





**SPEECH BY J. ALLEN WAMPLER ENTITLED, "CLEAN COAL TECHNOLOGY -  
AMERICA'S MARKETING EDGE," ON FEBRUARY 11, 1988**

**SPEECH AT THE 6TH WORLD CONFERENCE,  
SPONSORED BY THE MISSISSIPPI VALLEY  
COAL EXPORTERS COUNCIL**

**NEW ORLEANS, LOUISIANA**



# FOSSIL ENERGY SPEECHES

U.S. DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

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## Clean Coal Technology

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### America's Marketing Edge

It is a distinct pleasure to represent the Department of Energy in welcoming you to the World Coal Conference. I appreciate very much the opportunity to be a part of this important conference, and I hope my remarks this morning will underscore the importance we at the Department of Energy place on the role of coal — and particularly U.S. coal — in global energy affairs.

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*Remarks by  
J. Allen Wampler  
Assistant Secretary  
for Fossil Energy  
U.S. Department of  
Energy  
to the World Coal  
Conference  
in New Orleans,  
Louisiana  
on February 11, 1988*

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Let me also say that we at the Department of Energy — along with many of you in this audience — owe a debt of gratitude to the efforts of the Mississippi Valley Coal Exporters Council and to its leaders, particularly Susan Wingfield and Ernst Upmeyer. Susan has been a tireless voice in support of U.S. coal both here in the Mississippi Valley, in Washington as a member of our National Coal Council, and overseas as an advocate of U.S. coal interests. And those of you who know Susan know that when she speaks, people listen — and then they act. I hope that my remarks this morning are evidence of the fact that, based in large part on what we hear from Susan and Ernst and other members of the Mississippi Valley Coal Exporters Council, we are listening — and we are acting.

America's coal export policy is changing. It is evolving from a passive, somewhat "hands-off" approach to one that is more aggressive, more action oriented.



Eight years ago, Secretary of Commerce Malcolm Baldrige issued a five-point coal export policy. It basically said that government's role was to impose no regulatory or economic barriers to the sale of U.S. coal overseas, except in the event of a national emergency, and to remove those barriers already in existence if they were unnecessary or counterproductive.

There was good reason in the past for the government to take the position that "getting out of the way" of the U.S. coal industry and U.S. coal sales was the correct posture. A few years ago, the world coal market was a sellers' market. World coal trade had almost doubled in the twelve years from 1973 to 1985. America was the leading coal exporting nation in the world — and had been since World War II. Coal exports were on their way up, rising from 40 million tons annually at the start of the decade of the '70s to a record 113 million tons in 1981.

The energy consuming nations of the world were reducing their reliance on OPEC oil, and the vision of an armada of U.S. coal carriers fanning out across the globe, replacing Persian Gulf oil tankers, looked very real and possible. Then, the world changed.

Today, energy markets are in a state of transition as a result of the collapse in oil prices. Projections made one day can change dramatically the next. The Persian Gulf remains a tinderbox, but at the same time, the rest of the world is enjoying the economic benefits of lower energy prices. Economic growth is now the rule, rather than the exception, for most industrialized countries and for an increasing number of developing nations.

But with that growth comes increasing energy consumption. Free World reliance on Persian Gulf oil could rise to 30 to 45 percent of total oil requirements by the mid-1990s. OPEC's share could well return to the 50 to 60 percent range — comparable to the dominating position it held during the 1970s.

The consuming nations of this world have been given a grace period — a period in which to rebuild their economies, to restore their economic stability, to regain control of their own energy futures. But that grace period is rapidly drawing to a

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close. And unless we recognize that — and unless we take a more forceful, aggressive posture to build a more diversified, less oildependent global energy economy — we are destined to repeat the mistakes of the past. And ultimately, that modern Sword of Damocles — oil imports — could once again swing perilously close to our economic lifelines.

That's one reason why our national coal export policy is changing to a more aggressive posture. There is another.

For 40 years, the United States has attempted to convince the world that free trade is a vital part of the formula for a healthier and more productive global economy. But for 40 years, the world has found ways to grow more protectionist. There is no better example of that than the obstacles many of you confront daily when you attempt to sell your product overseas.

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*The U.S. will continue to encourage a free and fair trade policy. U.S. trade policy must reflect the fact that we live and work in a global economy and that our future prosperity lies in establishing stable, open relationships with our trading partners.*

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U.S. trade policy must have, as one of its preeminent goals, the objective of extending, by example and by negotiation, the benefits of free trade to the world economy and the assurance of competitive, unrestrained markets here at home. There is clearly a role for government in this area. It is a role we have pursued in the past, but now more than ever, it is a role that is critically important to the way you do business overseas. It is a role we must pursue more aggressively — and that we are doing.

Consider this for a moment: The cost of producing some 100 to 150 million tons of coal in six major coalconsuming countries in the non-socialist world is underwritten in some form by their respective government. If only one-third of this indigenous production could be replaced by imported coal, world seaborne coal trade could increase from its current level of slightly more than 300 million tons per year to nearly 350 million tons per year.



Or look at it another way: In Belgium, the government spends \$25,000 a year to keep each coal miner employed in that country. There are 18,000 miners in Belgium and most of them aren't even Belgian. That type of subsidy is unfair to American coal exporters, and it's unfair to Belgian consumers. And we must make that message heard.

Yes, the world has changed -- and it continues to change. The U.S. can no longer function independently from its global neighbors. We have moved from a posture of *selling*, where we could dictate to the customer his needs, to the necessity of *marketing*, where we must understand the customer's needs and preferences and provide the products or services to meet those needs. Other countries understand that. We are just beginning to.

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So a key aspect of our more aggressive coal export policy is to assist U.S. industry in understanding the social, political and economic climate of potential customers, as well as their energy needs. Look around the world -- you know this better than I do -- in other coal producing and exporting countries, you will find government and industry working together to find, *understand* and obtain markets. We, too, must do that and we are beginning some new initiatives in that area. I will describe some of them in a minute.

But going out and waving the flag, arguing for removal of trade barriers, and acquiring information about new market opportunities doesn't overcome the fact the U.S. is a high cost coal producer. We can't escape that reality.

But there are some other realities -- realities we should begin to recognize and take maximum advantage of in marketing overseas.

We have a stable, diversified workforce. Nearly 170,000 miners, in more than 5,000 mines, operated by 3,000 companies, ensure a competitive production environment. The contract reached within the last few days with the UMW should help strengthen that advantage.

And given the disruptions in South Africa and Poland, and the effect they have had on these countries as reliable coal sup-



pliers, we should use the stability and reliability of our workforce to its maximum marketing advantage. We have the infrastructure to handle large quantities of coal. Gone are the days when our transportation and delivery systems were bottlenecks to increased coal sales overseas. Major rail rehabilitation programs have been undertaken, with an emphasis on rebuilding track and upgrading equipment. New equipment, such as lighter weight gondolas, have resulted in heavier loads and an increase in the average number of coal tons loaded per car.

We have upgraded our river transportation system, and the quantities of steam coal moving to the port of New Orleans and metallurgical coal being exported through Mobile have increased sharply in the last few years. The opening of the Tennessee-Tombigbee Waterway in 1985 shortened the distance from the Tennessee River to the Gulf Coast.

Six important lock improvement projects were authorized by Congress in 1986 — the first such projects in 15 years. A model funding mechanism is now in place for these and future projects. Legislation was passed in 1986 that cleared the way for additional port expansions, including deepwater ports, when needed. It is clear that the nation's entire transportation system, from mine to port, stands in good shape.

But other countries have not been idle either. Since 1980, most major coal exporting countries have lowered their inflation-adjusted per-ton fees for inland transportation and terminal fees in response to intense competition. Greater infrastructure margins in Colombia, Australia and South Africa have allowed these countries greater flexibility in setting rates. That, too, is reality.

So, the U.S. simply can't afford to approach overseas markets carrying just the banner of a diversified workforce and a capable transportation infrastructure. These must be part of the package, but the package must be made more attractive.

I'm convinced that new technology can be the factor that makes that package most attractive. Here is where we can exploit an advantage that will be second-to-none in the world.

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Nearly a year ago, President Reagan pledged his support for a greatly expanded effort to demonstrate a new generation of innovative, clean coal technologies here in the U.S. The President's initiative builds on an ongoing program that has already resulted in the selection of 11 first-round demonstration projects with a total value approaching \$1 billion.

The President's pledge would add to that nearly 2 and 1/2 billion dollars in federal funds over the next five years, from 1988 through 1992. The funding would be at least matched by the private sector. In other words, this country — with the bipartisan support of both the Administration and Congress — has embarked upon a program to spend well over \$6 billion in the next five years to make the U.S. the world's showcase of new, environmentally clean, highly efficient coal-based technologies.

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*I think it is important that we also look at the Clean Coal Technology program as a powerful force in the world of international trade. Simply put, the Clean Coal demonstration program may provide the single most important advantage the U.S. could have in the global race for new technologies and new energy supplies.*

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In December, Congress approved the first increment of that funding proposal — \$575 million for fiscal years 1988 and 1989. In just over a week — on February 22 — we will issue the solicitation that will start the nationwide competition for a new round of clean coal demonstration projects.

Now many people have called the Clean Coal Technology Program the centerpiece of the Administration's response to acid rain. And it is that. It is also a key component in our response to growing concerns over national energy security and rising oil imports.

But I think it is important that we also look at the Clean Coal Technology program as a powerful force in the world of international trade. Simply put, the Clean Coal demonstration program may provide the single most important advantage the U.S. could have in the global race for new technologies and new energy supplies.

Again, consider this for a moment: If this program is successful, by the early to mid-1990s, the U.S. could have in place a full complement of demonstration facilities — each showcasing a new clean coal concept: new combustors, new scrubbing concepts, new coal cleaning devices, new power generating options, all using U.S. coals.



The ability to show a prospective overseas customer an actual, operating facility — running on U.S. coal — rather than just a drawing board concept or an engineering prototype, will be a very persuasive inducement. It could be the advantage that sways overseas consumers to "buy American" — an American package of coal and the proven technology to burn it cleanly and efficiently.

When we talk about the Clean Coal program here at home, we often talk about a "window of opportunity." Our energy producing sector is today being confronted with key decisions regarding environmental policy, economic growth particularly in terms of future power generating capacity, our aging fleet of power plants, and the costs to consumers of supplying reliable sources of energy. These are critical decisions that will confront us for the remainder of this century. And the consequences of our choices will be with us for future generations. Coal can become the fuel of choice in these decisions, *if* suitable technology can be developed, demonstrated and deployed in a reasonable timeframe. That's the "window" we talk about. It's opening here at home. It is also opening overseas.

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*Countries may be willing to pay a premium for the bulk resource if they know it comes packaged with technology that meets these social, economic and environmental concerns. That's the importance of America's Clean Coal program overseas.*

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There is a growing environmental consciousness in many industrialized parts of the world. The Helsinki Protocol, signed by 16 nations, calls for a 30 percent reduction in sulfur emissions. There have been similar proposals within the European Community and in several emerging nations. Demand is increasing for safe, effective energy technology that does not impose further burdens on environmental quality. There is also a growing demand for lower cost, higher efficiency energy concepts — concepts that won't reverse the recent gains in economic growth by imposing new costs on consumers.

Countries may be willing to pay a premium for the bulk resource if they know it comes packaged with technology that meets these social, economic and environmental concerns. That's the importance of America's Clean Coal program overseas. And that's why America's coal industry must recognize that tomorrow's sales teams will be most effective if they include producers, engineering and construction firms, and equipment manufacturers, all working together to market a package that fits a customer's needs.



"Fits a customer's needs" — those are key words. In an age of marketing, rather than selling, America's competitiveness will hinge largely on how well we understand those words.

I said earlier that a key aspect of our more aggressive coal export policy is our efforts to lay the groundwork in giving industry that kind of information. We've undertaken three major initiatives in this area.

One is tied directly to the Clean Coal demonstration program. We are examining the large industrial and utility boiler market in Europe to determine where emerging clean coal technologies can best compete.

Consider this for a moment: If we could displace one quarter of the residual oil used by the 12 EEC member nations with coal, we could boost coal exports by at least 20 million tons per year. Or look at the potential for new capacity additions. OECD countries, not counting the U.S., have announced plans to increase new coal-fired generating capacity by 25 gigawatts by 1991 and by an additional 53 gigawatts after 1991. Initially, most of these capacity additions will be in Italy, Japan and Turkey, and subsequently in Germany and Austria. That's one opportunity. The non-OECD countries may offer another — perhaps even better — opportunity. In these countries, coal-fired capacity could increase from just under 60 gigawatts today to more than 100 gigawatts by 1991 and to more than 170 gigawatts by the mid to late 1990s.

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*We view Italy as a model of how the U.S. government can work with its foreign counterpart, and in turn with U.S. industry, to open the door to new, overseas markets. So far, that model effort has lived up to our expectations.*

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U.S. companies could play an important role in providing both conventional technology and in the future, advanced, clean coal technologies, particularly for the latter increment of power capacity. If even half of the world's expected expansion in coal use could be met by U.S. manufactured equipment, the value to the U.S. by the year 2000 would be on the order of \$35 billion per year. But we have to begin now to open the doors to those markets.

Our cooperative efforts with Italy are a step in that direction. We view Italy as a model of how the U.S. government can work with its foreign counterpart, and in turn with U.S. industry, to open the door to new, overseas markets. So far, that model effort has lived up to our expectations. The Italians have



initiated an aggressive energy policy centered largely on coal. They are now becoming familiar with U.S. coal technology, and we, in turn, are becoming familiar with how they do business.

Four days ago, I returned from a trip to Italy that included a review of a joint project to use U.S. coal, in slurry form, super-cleaned with advanced coal preparation processes, in an Italian oil boiler. That project could be the forerunner of new trade opportunities — for both the hardware and the coal itself.

Government can help open that door, but it must be U.S. industry that walks through it and delivers the product. That's why I was particularly pleased to have Ernst Upmeyer accompany us on the trip, and that's why we will be bringing private U.S. coal producers and U.S. technology firms into the project over the next year.

At the Department of Energy, we have 21 ongoing bilateral R&D efforts in coal technology involving 13 countries. We have seven additional, multi-lateral projects underway. All can represent future trade opportunities as U.S. companies learn more about the needs of foreign countries and they, in turn, become more familiar with U.S. vendors and the potential of emerging U.S. technology.

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*At the Department of Energy, we have 21 ongoing bilateral R&D efforts in coal technology involving 13 countries. We have seven additional, multi-lateral projects underway. All can represent future trade opportunities...*

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The second major initiative we have undertaken is to examine the small combustor market overseas. U.S. coal traders and equipment suppliers have largely overlooked this market, and yet, it offers some very distinct advantages. Unlike the commercial and residential market here in the U.S., coal is already a familiar, sometimes dominant fuel source in this market overseas. The infrastructure already exists. Coal combustors are already being sold.

One of our contractors recently surveyed 23 European and Asian countries to determine the market for coal-fired equipment in sizes less than 50 million Btus per hour. They found significant use of small coal-fired boilers in the commercial and light industrial sectors of several of these countries — countries like Denmark, Great Britain, New Zealand, Sweden, and Switzerland. Residential stoves and furnaces are also being sold. For example, how many of you know that the City of Istanbul is almost 100 percent coal-fired?



But the key point here is that most of the technology on the market is vintage 1940. Much of it is environmentally polluting and inefficient. Most of it could not stand up against the efficiency or cleanliness of modern fluidized bed boilers or other advanced combustion concepts. Just over a month ago, one of our first Clean Coal projects successfully started operation — an advanced, slag-rejecting combustor, 30 million Btus per hour, retrofitted onto an existing oil-fired boiler. That combustor could become a commodity in great demand in many overseas countries if follow-on marketing initiatives are undertaken. We will have a more complete assessment of this market completed by this fall, and we will make our findings known to industry.

Our third initiative takes on much the same flavor — looking beyond traditional markets for new opportunities. Such opportunities exist in the lesser developed countries, and our LDC initiative is attempting to identify where those opportunities are most attractive.

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*Our goal is to sponsor, with U.S. industry and other elements of U.S. government, a model cooperative project in one or more of the selected countries — a project that would serve as a "roadmap" to further cooperative ventures and further sales to these emerging nations.*

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We have screened 75 AID-assisted nations, identified those that look most promising, and now we're crossmatching five coal technologies to the nations selected. We're examining advanced, slagging combustors, coal water mixtures, coal preparation techniques, atmospheric fluidized beds, and gasification-combined cycle power generation for their feasibility in these countries. Our goal is to sponsor, with U.S. industry and other elements of U.S. government, a model cooperative project in one or more of the selected countries — a project that would serve as a "roadmap" to further cooperative ventures and further sales to these emerging nations. A key criteria in this effort will be the mandatory requirement that the demonstration effort be tied to a long-term, U.S. coal contract.

We are very cognizant of the fact that none of these initiatives can succeed unless industry is an active partner, and I mean by that, *all* sectors of U.S. industry — producers, AE firms, manufacturers, service organizations, financiers — a systems approach structured and oriented to produce a team effort and a packaged product.

Hardware — from combustors to gas cleanup, to advanced sensors, instrumentation, diagnostics and process controls —



can be an effective marketing tool when included with the coal itself. That type of linkage can give us our marketing edge. But it is a linkage that must be forged within, and by, the coal industry.

The U.S. has struggled in the past with stop-and-start federal policies, changing government roles, and a failure of government and industry to adequately communicate. Today, I believe, we have a consensus approach, a clearer understanding of the fact that government must take an aggressive, more focused posture not only in promoting U.S. coal abroad, but working actively here at home.

Our role extends much beyond simply advocating the removal of trade barriers. We recognize the unique role we have in providing industry with the logistical information it needs to get a foot in the door, both in established markets and in new or previously overlooked markets. We also recognize the clear advantage we can provide industry by assisting in the demonstration of new, clean coal concepts.

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*Coal technology is moving into the 21st Century. It is important that our marketing strategies and approaches do likewise. To make that happen, we recognize the need to consult more closely with industry on the types of programs that will be most effective in opening buyers' doors overseas.*

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Coal technology is moving into the 21st Century. It is important that our marketing strategies and approaches do likewise. To make that happen, we recognize the need to consult more closely with industry on the types of programs that will be most effective in opening buyers' doors overseas. This is true in the sale of conventional technology, advanced clean coal technology, or even in the pursuit of bilateral R&D projects. That's why our close association with the Mississippi Valley Coal Exporters Council, the Coal Exporters Association, and individual members of the U.S. coal and equipment industry remains vital to our efforts.

I'm not promising that these actions will lead to skyrocketing coal sales overnight, nor am I promising that these actions will ensure that all countries turn to the U.S. as their future coal supplier. But what I am promising is that these actions will give America a better chance of competing abroad. And if past history is any guide, all American industry needs is a chance.